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Preparing K-12 Teacher Candidates to Teach Reading Comprehension: A Targeted Review of Quantitative Studies

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Abstract: *This targeted review of the literature analyzes quantitative studies (2001–2025) on how K–12 teacher preparation programs equip pre-service teachers to teach reading comprehension. Findings emphasize the importance of explicit strategy instruction, reflective practice, and embedded field experiences to improve comprehension instruction while balancing technical and pedagogical knowledge.*

Key Words: reading comprehension, instruction, pre-service teacher, teacher preparation, systematic review

Introduction

Undoubtedly, robust teacher preparation is essential for a skilled educator workforce (Darling-Hammond et al., 2024). Yet national reports claim that only half of teacher preparation programs are sufficiently preparing Pre-Service Teachers (PSTs) of reading (Drake & Walsh, 2020; Ellis et al., 2023). With controversy in the field about the best approaches for teaching reading (Castles et al., 2018), it is more important than ever to know how teacher preparation programs are preparing PSTs to teach reading. While one recent review (Tortorelli et al., 2021) investigated teacher-preparation instruction for decoding-related reading instruction, we could not locate any related research investigating teacher-preparation for supporting reading comprehension instruction. This study presents a targeted review of how PSTs are learning to teach reading comprehension.

Reading comprehension is the creation of a mental representation via interaction with and extraction from a text (Snow et al., 2003). Common evidence-based instructional practices for comprehension include cognitive strategy instruction, explicit vocabulary instruction, and knowledge activation and building (Budin et al., 2022; Filderman et al., 2022; National Reading Panel, 2000; Shanahan et al. 2010). Evidence suggests that effective comprehension instruction is rare, with the majority of instructional practices focusing on surface-level comprehension or low-leverage initiate-respond-evaluate practices (Capin et al. 2024; Reynolds et al. 2025).

While many factors influence student comprehension outcomes, teacher knowledge of reading comprehension and its associated effective instructional practices appears to be an

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essential ingredient (Hudson, 2023). Reutzel and colleagues (2011) argue that three main types of knowledge are thought to contribute to effective comprehension instruction—technical knowledge, pedagogical knowledge, and situated knowledge. Technical knowledge involves understanding the technical aspects of reading comprehension and the various factors that influence it. Pedagogical knowledge involves understanding the evidence-based practices that contribute to student comprehension. Situational knowledge is a pragmatic understanding of how to effectively apply and integrate the comprehension practices in classroom contexts.

Research Questions

Given the centrality of reading comprehension in modern public education, the increasing scrutiny of teacher preparation practices, and the current lack of synthesis in the field, we conducted a targeted review to understand how the extant research on PST preparation for comprehension instruction. In doing so, we asked the following research questions:

RQ 1: How has knowledge of reading comprehension in teacher preparation been studied?

RQ 2: How have technical, pedagogical, and situated literacy knowledge been examined in the research?

RQ 3: What does this body of research reveal about preservice teachers' knowledge and pedagogical preparation of reading comprehension?

Method

We conducted a literature review of quantitative studies related to teacher preparation comprehension instruction from 2001 to 2025. Our goal was to understand the current reading comprehension instruction research for PSTs, summarize findings in this area, and provide a pathway for future research about preparing future teachers in reading comprehension.

Data Collection and Analysis

We use the following search strand with the education databases: APA PsychInfo, Education Full Text, Education Source, and ERIC:
(comprehen* OR "meaning making" OR "constructing meaning" OR "text understand*") AND (read* OR "language arts" OR literac*) AND ("preservice" OR "student teach*" OR "teacher preparation program" OR "education preparation program")

This search resulted in 2,319 total references. The research team removed duplicates and reviewed the resultant 1,909 abstracts. Articles were screened against the following inclusion criteria: each study had to (a) be published in a peer-reviewed journal, government report, or edited book chapter, (b) be published in English, (c) study the preparation of PSTs to teach reading comprehension, (d) use quantitative methods, and (e) included at least one comprehension-related measure of PSTs. Through the systematic search a preliminary coding framework was developed deductively based on prior reviews (e.g., Tortorelli et al., 2021) and refined inductively after pilot coding five randomly selected studies with all team members. The final common codebook included study-level variables (e.g., publication year, country, participant demographics), quantitative design classifications (e.g., randomized controlled trial, quasi-experimental, pre-post), instrument characteristics (novel, pre-existing, adapted), statistical

analyses used (e.g., t-tests, ANOVA, correlation), study quality indicators (e.g., sampling method, reporting of internal consistency, use of control groups, attrition), and the type of literacy knowledge assessed (technical, pedagogical, situated). Each code was accompanied by operational definitions and decision rules to support consistency across coders.All team members participated in structured training using the finalized codebook. Dual coding was conducted during initial screening and descriptive/demographic extraction. Percent agreement prior to adjudication was 93.7% for inclusion decisions and 95.4% for descriptive coding. Calibration coding of full-text quantitative variables yielded 93.2% agreement before reconciliation. Discrepancies were resolved through consensus discussion. Percent agreement was calculated at the study level prior to adjudication.

For quantitative studies, data extraction included design features, participant characteristics, intervention dosage, measures used, validation status, and statistical tests reported. When studies reported quantitative outcomes, we extracted reported test statistics, significance levels, and effect sizes when provided. Effect sizes were not recalculated if absent. Since outcome measures, analytic approaches, and reporting practices varied substantially across studies, statistical aggregation (e.g., pooled effect sizes, weighted means, moderator analyses) was not conducted. Instead, consistent with a targeted review approach, we employed a structured narrative synthesis. We tabulated the direction of findings (positive, null, mixed), summarized reported magnitudes when available, and calculated frequencies and percentages across studies without weighting by sample size.

RESULTS

RQ 1: How has knowledge of reading comprehension in teacher preparation been studied?

Table 1 reports descriptive statistics for the nine quantitative studies in the corpus. Broadly, these studies represent a worldwide sample of preservice teachers (PST), favoring U.S.-based (n =8), elementary (n = 9), and general education (n= 8) PSTs; and including a variety of K-12 embedded experiences (n = 4).

Table 1

Descriptives of quantitative studies for pre-service teachers

N Studies (%)		N Age group of PST[a] (%)		N Licensing area (%)			N Location[b] (%)		N K-12 embedded (%)		n PSTs K-12 embedded (%)
Quant	*Mixed*	*17-21*	*22+*	*GenEd*	*SPED*	*EFL*	*USA*	*Foreign*	*Yes*	*No*	
6 (54.5)	5 (45.5)	10 (90.9)	8 (72.7)	9 (81.8)	1 (9.1)	1 (9.1)	8 (72.7)	4 (36.4)	4 (36.4)	7 (63.6)	81 (13.9)

Note. Total PSTs in quantitative studies n = 584. Quant = Quantitative studies; PST = Pre-Service Teacher; GenEd = General Education; SPED = Special Education; EFL = English as a Foreign Language; [a] 7 studies had PSTs in multiple age ranges; 2 studies did not list ages.

[b] 1 study had participants in Canada and USA.

Studies in the corpus used 17 different quantitative measures to evaluate comprehension knowledge and instruction. Eleven were novel, four were pre-existing, two were pre-existing but

adapted for the study, and only the Literacy Information Knowledge Scale (LIKS, Reutzel et al., 2007) recurred. Due to the breadth of measures used to evaluate technical, pedagogical, and situated knowledge, there is a lack of comparable, converging evidence which stands in contrast to Tortorelli et al. (2021) which reported more recurring measures.

Table 2 illustrates study quality indicators that suggest a less robust corpus. Only two studies used randomization to support causal inferences. Less than half reported that their assessment measures were validated with PSTs (n = 4). Only Ciampa and Gallagher (2021) reported internal consistency validity. Ely et al. (2018) was the only study in the corpus to provide cut scores for interpretation. Only four studies included a counterfactual condition, and few reported attritions (n = 3). There was also a notable underrepresentation of secondary PSTs (n = 0) and special education PSTs (n = 1) in the corpus.

Table 2

Study quality indicators

	Did the study use a convenience sample or a random	Were the assessments perviously used with preservice teachers?	Was internal consistency reported (i.e., Cronbach's alpha), and	Were any assessments used included or cited so they could be located?	Were cut scores or other interpretation criteria provided for	If gains on pre/post assessments were reported, was there a control or comparison group?	Percentage of attrition
Al Otaiba et al. (2012)	Convenience	2 Instruments= N 1 Instrument= P	N	2 Instruments = N 1 Instrument = Y	N	Y	NR
Barrentine et al. (2011)	Convenience	P	NR	N	N	N	Y, <10%
Boche et al. (2021)	Convenience	1 Instrument = N 1 Instrument = Y	N	Y	N	N	NR
Ciampa & Gallagher (2021)	Convenience	2 Instruments = Y	Y, both highly reliably (>.80)	Y	N	Y	NR
Clark et al. (2017)	Convenience	1 Instrument = P	N	Y	N	N	Y, <10%
Ely et al. (2018)	Random	1 Instrument = N 1 Instrument = Y	N	N	Y	Y	Y, <10%
Klapwijk (2016)	Convenience	N	N	1 Instrument = N 1 Instrument = Y	N	N	NR
Sampson et al. (2013)	Convenience	N	N	Y	N	N	NR
Yadav et al., (2009)	Random	N	N	N	N	2 Instruments = Y 2 Instruments = N/A	NR

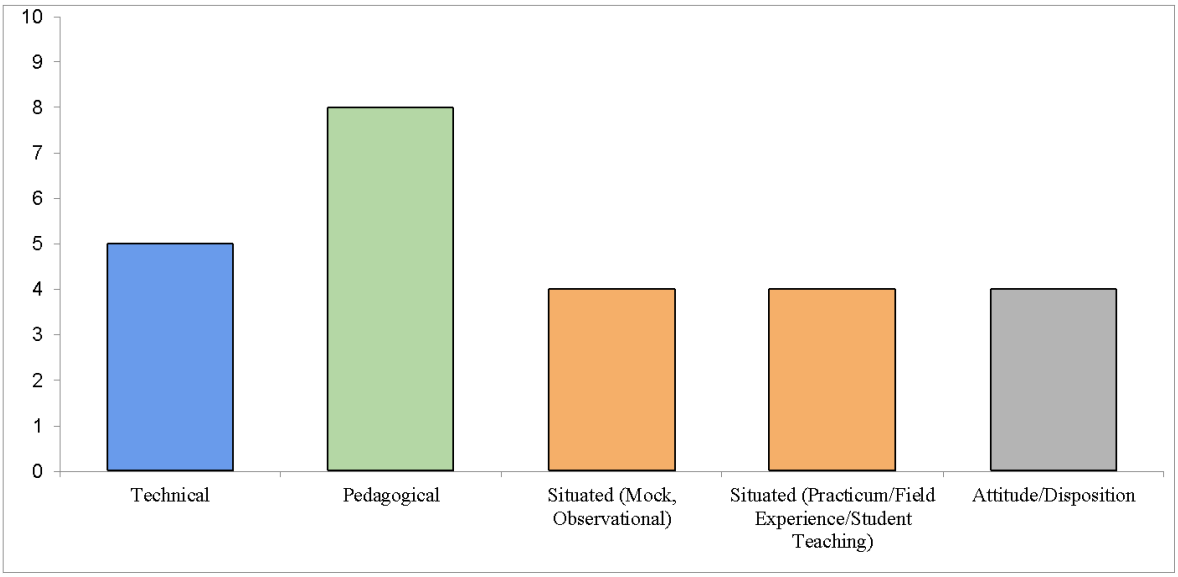
Note: Numbers indicate the number of instruments, as studies used multiple instruments. Y=Yes, P=Partial(ly), N=No, NR = Not Reported, NA = Not Applicable

RQ 2: How have technical, pedagogical, and situated literacy knowledge been examined in the research?

Tortorelli et al. (2021) investigated teacher preparation for code-related reading instruction and identified three types of knowledge that preservice teachers develop through their teacher preparation programs. We adopted these three knowledge types (e.g., technical, pedagogical, and situated knowledge) and the coding scheme reported by Tortorelli et al. (2021) as a basis for our review. Figure 1 shows that in this systematic review, focused on reading comprehension instruction, those results were inverted with the greatest number focused on situated knowledge (n = 8) applied in practicum, field experiences, student teaching, observational opportunities, or mock classes and pedagogical knowledge (n = 8). Technical knowledge was the focus of five studies, and four studies measured attitude or disposition of PSTs.

Figure 1

Types of PST knowledge studied



A variety of data and modes of knowledge assessment were reported, as shown in Table 3, which highlights that surveys were most common (n = 6), tests (n = 5), lesson plans (n = 2), text/case analysis (n = 2), logs (n = 1), and simulations (n = 1).

Table 3

Modes of instruments measuring knowledge types

Study	Logs	Tests	Surveys	Lesson Plans	Text/Case Analysis	Simulation	Attitude/ Disposition Survey
Al Otaiba et al. (2012)	☑	☑	☑				☑
Barrentine et al. (2011)		☑			☑		
Boche et al. (2021)				☑			
Ciampa & Gallagher (2021)			☑				☑
Clark et al. (2017)			☑				
Ely et al. (2018)		☑				☑	☑
Klapwijk (2016)			☑	☑			
Sampson et al. (2013)		☑	☑				
Yadav et al., (2009)		☑	☑		☑		☑

RQ 3: What does this body of research reveal about preservice teachers' knowledge and pedagogical preparation of reading comprehension?

The heterogeneity of measures reported in RQ 1 limited cross-study statistical comparison of PST comprehension knowledge and pedagogical preparation. To determine the results for RQ 3, we utilized a structured narrative synthesis. Specifically, we analyzed the corpus by tabulating the outcome directions (positive, null, mixed), the magnitude of the outcomes (effect sizes and/or mean differences), and the post-test performance levels of the preservice teachers across the studies. After, we engaged in thematic analysis to determine salient themes from the existing corpus. Through this synthesis, we found that seven of the nine studies reported statistically significant pre-post gains in at least one comprehension-related outcome, with effect sizes ranging from small to moderate.

These encouraging increases are tempered by the PST post-test performance on comprehension knowledge assessments, with mean scores ranging from 43% to 70% correct. (Al Otaiba et al., 2012; Barrentine et al., 2011; Ciampa & Gallagher, 2021; Clark et al., 2017; Ely et al., 2018). In the only study reporting criterion-referenced cut scores (Ely et al., 2018), fewer than half of participants achieved the designated proficiency benchmark.

Thematic analysis findings suggested that while teacher preparation coursework and field experiences may improve comprehension-related knowledge, gains may not consistently result in mastery-level understanding. Furthermore, Ciampa and Gallagher (2021) reported a statistically significant negative correlation between self-reported confidence and measured knowledge, raising concerns about calibration of preservice teachers' perceived readiness. Collectively, the corpus suggests modest but incomplete knowledge development, variability in pedagogical enactment, and limited evidence that preparation consistently produces proficiency-level competence in reading comprehension instruction.

Discussion

These studies, organized and codified by the research team, underscore the necessity of competent, well-trained reading comprehension teachers if we are to successfully foster student academic achievement. They also consistently point to the inherent tension between technical knowledge (i.e., what a teacher needs to know about reading and reading development) and pedagogical knowledge (i.e., what a teacher needs to know about teaching reading). The studies reveal several themes related to comprehension instruction. Comprehension instruction is under-implemented with lessons tending to be surface level, using low-level questioning or focus on 'products' (e.g., worksheets) rather than modeling or teaching comprehension (Barrentine et al., 2011; Klapwijk, 2016; Sampson et al., 2013).

Further, strategy instruction dominated the corpus as a primary approach to reading comprehension. Although an evidence-based practice, research indicates that strategy instruction is enhanced when integrated with other productive comprehension practices, such as background knowledge instruction (Elleman & Compton, 2017; Filderman et al., 2022; Peng et al., 2023). The predominance of strategy instruction within the teacher preparation corpus for comprehension suggests that PSTs may be insufficiently prepared to weave the multiple facets required to support rich comprehension development.

Scaffolded field experiences appeared to help PSTs because guided practicum teaching, tutoring, and simulated classrooms appeared to improve inclusion of practices (Ciampa & Gallagher, 2021; Clark et al., 2017; Ely et al., 2018). Although 44.44% of the studies (n = 4) included field experience, the number of teachers in these studies was much smaller: only 26% participated in a field experience. Comprehension instruction practices were less common in contexts where the cooperating teacher used less comprehension modeling or the placement took place near end-of-year state testing (Boche et al., 2021; Sampson et al., 2013).

Finally, studies analyzing coursework found that the emphasis of courses and the alignment of methods mattered more than the number of courses (Boche et al., 2021; Clark et al., 2017). This corpus also includes a diverse array of practices employed to promote comprehension instruction in pre-service education, including metacognitive strategies (Cubukcu, 2008; Knellesen et al., 2024), integrating knowledge from multiple text sources (Lehmann et al., 2019), and summarizing (Abdallah & Mahmoud, 2018).

Conclusion

This systematic review highlights how teacher preparation programs influence prospective teachers' knowledge of and beliefs about reading comprehension instruction. The studies collectively emphasize the need for explicit instruction of comprehension strategies, practical demonstrations, opportunities for teacher reflection on implemented strategies, and embedded practicum experiences to teach these strategies effectively with students. Teacher preparation programs must forge a strong link between classroom learning and practical application, demanding multi-faceted solutions that support all students equitably while adapting teacher preparation instruction (Tortorelli et al., 2021). Such programs offer hope for both pre-service teachers (PSTs) learning to teach reading comprehension and the students who will ultimately benefit by creating meaning from their reading.

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