

Preparing Teachers: Cognitive Learning Strategies in Teacher Education Programs

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Research Article

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The author declares no conflicts of interest.

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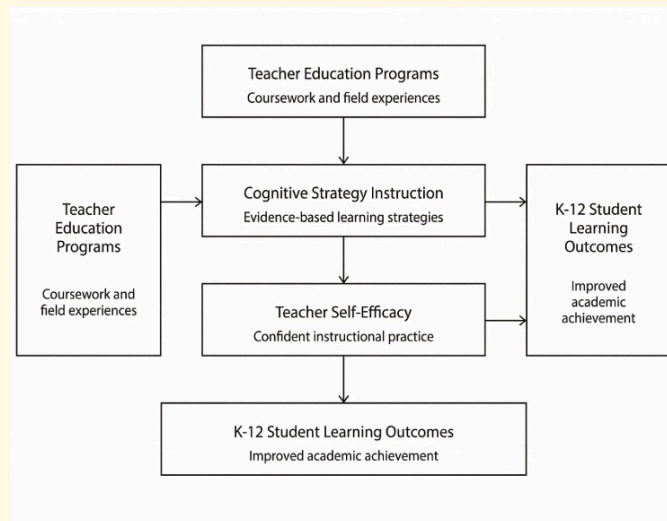
Professional Development

Qualitative Research

Abstract

Teacher education programs are tasked with the critical work of preparing educators to teach K-12 students content area knowledge and skills. Equipping these candidates with instructional strategies backed by decades of cognitive research before they enter the classroom is one route to ultimately foster student learning. This paper explores the experiences of 12 Western U.S. graduates regarding cognitive learning strategy instruction using a hermeneutic phenomenological study. Data collected through surveys, interviews, and a focus group led to the identification of themes about program instruction, common misunderstandings of cognitive science, and teacher readiness. Findings indicate limited integration across programs, creating a "theory-practice" gap where new teachers rely on intuition over scientific principles. These results highlight

areas for improvement in supporting student learning outcomes.



Abstract photo. *Conceptual framework illustrating the integration of cognitive learning strategies within teacher education to enhance K-12 student success.*

Keywords: cognitive learning strategies, credential, learning science, pedagogy, preservice teacher, teacher education, teacher preparation

Introduction

Teacher education programs are primarily responsible for giving future educators the knowledge and teaching skills they need to effectively help K-12 students. In recent decades, however, the teaching profession has faced growing public criticism and a loss of trust, largely due to continuously declining test scores and concerns about unmet educational needs. Research-backed cognitive learning strategies, which have been proven effective across brain science and educational studies, are a promising way to improve teaching practices and, therefore, student outcomes (Agarwal et al., 2014; Agarwal & Roediger, 2018; Madan, 2023). Despite these clear benefits, serious debate continues about the priorities and focus of teacher training programs, even as student achievement in key subjects such as reading and mathematics continues to decline.

Even with the growing evidence supporting their effectiveness, cognitive learning strategies are still not regularly included in teacher education classes (Cuevas et al., 2023). Research suggests that teachers with better basic knowledge of how students learn are better at teaching, especially for tasks that require deep critical thinking (Darling-Hammond, 2023). The results of this teaching gap are significant; cognitive learning strategies have been linked to clear improvements in language learning, math skills, and reading ability (Barbieri et al., 2020; Weinstein & Acee, 2018). Their absence has been linked with lower grades, less student confidence, and higher school-related stress.

Teacher readiness, also, is one of the strongest signs of both teacher effectiveness and student learning success. While existing research has focused heavily on student teaching and coursework, a clear gap remains regarding graduates' views, specifically, how teachers use cognitive learning strategies within the realities of their own classrooms after finishing their program. This study addresses that gap by providing first-hand data on how teachers use these strategies on the job, with the aim of improving lessons that may better strengthen teacher preparation and finally improve classroom results.

Methods

Research design and participants

In this study, a qualitative, hermeneutic phenomenological approach was used to explore the lived experiences of recent teacher education graduates (Creswell & Poth, 2018; Kircher, 2024; Van Manen, 1990). This was the research approach for this study because the researcher shared many of the same experiences with the phenomenon as the participants, using their experience as both a graduate and a current instructor to guide the interpretation of the phenomenon (Van Manen, 1990). This approach emphasizes understanding the essence of experiences through an interrelationship of one's description of their experience and the underlying dynamics that account for that experience (Husserl, 1970). The study included 12 recent graduates from three universities in the Western United States, including a large state university, an online non-profit institution, and a for-profit urban institution. All participants had graduated within the last one to five years and taught in K-12 schools across a range of subject areas, including Visual Art, Mathematics, and the Humanities.

Data collection and analysis

Research followed a multi-phase sequential design, moving from broad surveys to 30-to-60-minute interviews done via Zoom, and ending in a one-hour focus group (Creswell & Poth, 2018). This order was on purpose, helping data triangulation by moving step-by-step from broad trends toward more specific and detailed discussion (Creswell & Poth, 2018). Data were then analyzed through a mix of thematic analysis and pattern coding (Kiger & Varpio, 2020; Saldana, 2021). NVivo software was used to find and organize common patterns in how participants viewed their training and how they used cognitive strategies at work. University review board approvals were obtained before starting to ensure that all ethical standards were followed throughout the research study.

Results

Program incorporation of strategies

Of the 12 participants, 10 said they were taught cognitive learning strategies, though the amount varied. Strategies were mostly included through textbooks and assignments. Specifically, Vivian observed that reference books improved her understanding, while Taylor stressed learning by doing. However, this was limited; Julie felt the instruction "wasn't as connected" to her specific subject, and Grace remarked it was only found in "early development" courses. Six participants said they needed more instruction, feeling not ready to support students with reading difficulties or older struggling students. Participants wanted these strategies to be "embedded into every course" and included in the coaching models during student teaching.

The reality of misunderstandings

A distinct finding was that 11 out of 12 participants had misconceptions about cognitive learning strategies. Many thought common teaching practices or "neuromyths", like learning styles, were cognitive strategies. George maintained that specific examples like retrieval practice were never clearly described in his program. Rebecca mistakenly called "multiple ways to express knowledge" (image-making, dialogue) cognitive learning strategies. If a tool seemed successful in class, participants were likely to label it a cognitive strategy no matter its scientific basis. Bryce felt that strategies might have been taught but were never specifically named.

Preparation and post-graduation support

Participants felt unready for classroom management and handling different learning needs in large classes. Julie found it hard to deal with diverse experiences due to large class sizes. Beyond that, seven participants wanted support after their programs ended, looking for handbooks or community networks to handle classroom problems. Laura noted that while she learned about the strategies, they did not help her teaching because they seemed designed for small class sizes with extra help.

Discussion

The knowledge gap and dunning-kruger effect

The varied views reported among graduates suggest that while coursework and fieldwork are key parts of teacher preparation, education programs still fail to provide enough background in cognitive strategies as a clear area of practice (Cuevas et al., 2023). The confusion between cognitive strategies and other teaching methods may come from the Dunning-Kruger effect, a situation where individuals stay highly confident in their skills despite knowing little about a specific topic (Dunlosky & Metcalfe, 2009). Most participants seemed to depend on intuition and personal stories rather than brain-based or proven models to guide how they teach. These findings highlight a major gap in teacher education programs, specifically the split between cognitive science and classroom teaching, and show a need for more organized work to fix this gap within teacher training.

Structural barriers and future directions

Programs face natural conflicts between tough coursework and heavy fieldwork, where high-stakes assessments like the CalTPA risk acting as costly distractions from meaningful learning (Lambert, 2024). Program improvements might include better use of neuroscience content and ensuring that university teaching and learning centers have real expertise in learning science. Where it makes sense, faculty could replace individual course offerings with action research, enabling immediate evaluation of teaching strategies in actual contexts. Purposeful mentorship that includes cognitive learning strategy instruction remains vital to long-term teacher effectiveness (Hairon et al., 2020; Hobson et al. 2009). Future research should further investigate whether these gaps are more common within specific content areas or grade levels.

Figures and Tables

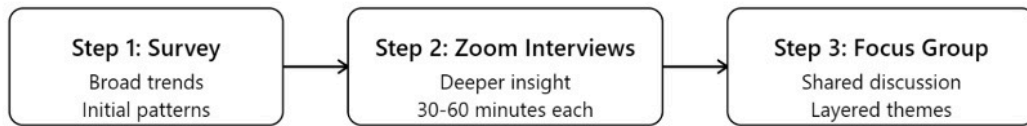


Figure 1. *Data Collection Sequence. The multi-phase qualitative approach moved from broad survey data to specific focus group discussions to ensure data triangulation.*

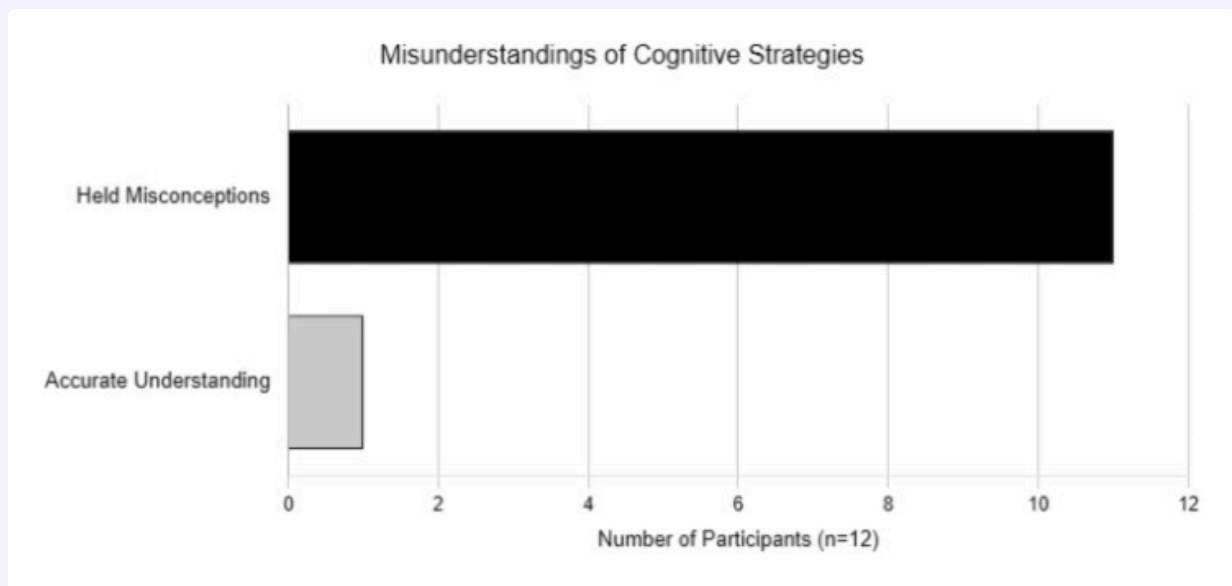


Figure 2. *Participant Misunderstandings. Nearly all participants confused general pedagogical tools or neuromyths with cognitive learning strategies.*

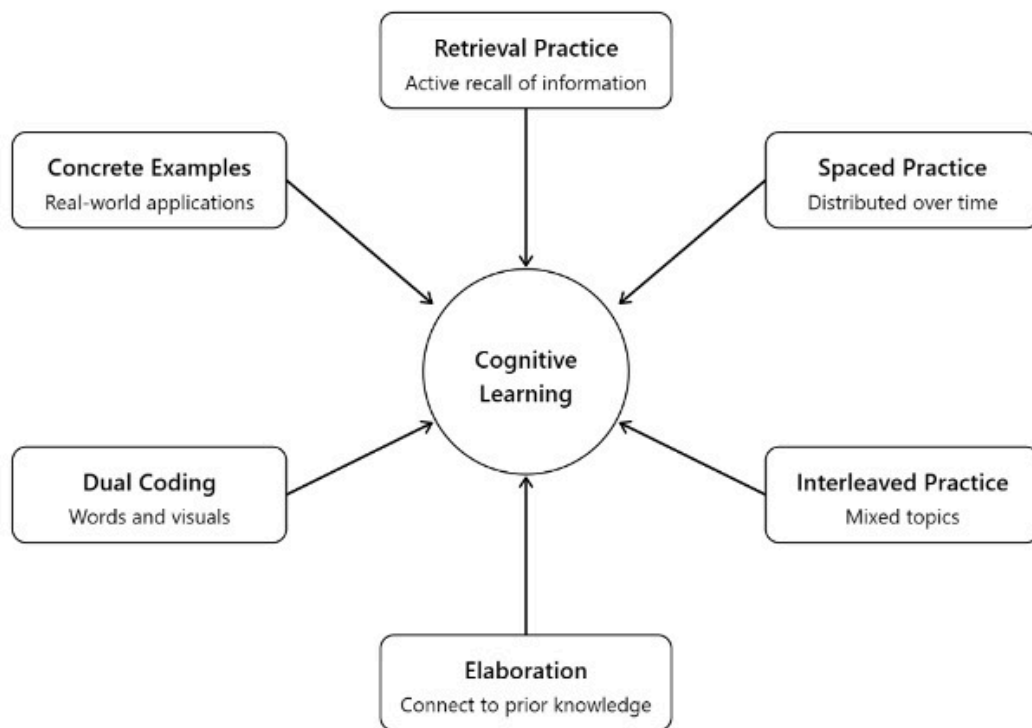


Figure 3. *Effective Cognitive Strategies. These six strategies are recognized in the literature but were inconsistently recognized by participants.*

Table 1. Participant Snapshot				
Pseudonym	Years Taught	Gender	Grade Level	Content Area
Julie	1	Female	High School	Visual Art
Grace	5	Female	High School	Visual Art
Bryce	3	Male	High School	Visual Art
Kevin	1	Male	High School	Math
Alice	1	Female	High School	Social Sciences
Nora	1	Female	High School	Social Sciences
Rebecca	1	Female	High School	Social Sciences
Laura	1	Female	High School	World Languages
Vivian	1	Female	High School	World Languages
Taylor	1	Female	K-12	Music
Loren	2	Female	Middle School	Visual Art
George	1	Male	Middle School	Humanities

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Author Contributions

Nicole Kircher: Conceptualization, Methodology, Formal Analysis, Investigation, Writing – Original Draft, Writing – Review & Editing.

Data Availability

Data is publicly available here: Kircher, Nicole (2024). Themes, Subthemes, Codes.xlsx. figshare. Dataset.

<https://doi.org/10.6084/m9.figshare.29104769.v1>

Transparent Peer Review

Results from the Transparent Peer Review [can be found here](#).

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AI Use Statement

No AI tools were used in the preparation of this manuscript.

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