Pre-Service EFL Teachers' Experiences with Fast-Mapping Strategies for Vocabulary Instruction in Hunan Middle School EFL Classrooms

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ABSTRACT:
Pre-service teachers play a pivotal role in facilitating vocabulary acquisition within English as a Foreign Language (EFL) contexts. In Hunan middle schools, however, they face significant challenges, including overcrowded classrooms, limited pedagogical training, and unequal access to digital resources, which constrain the implementation of strategies such as Fast Mapping. Despite its recognized effectiveness for rapid lexical acquisition, the experiences and knowledge of pre-service teachers in applying this strategy remain underexplored. This study investigates the conceptual understanding and practical application of Fast-Mapping–based vocabulary instruction among five pre-service teachers, examining how institutional constraints, teacher beliefs, and communicative competence influence classroom enactment. Using an exploratory qualitative design, data were collected through semi-structured interviews and analyzed thematically, guided by Cognitive Load Theory to account for instructional cognitive demands. Findings reveal that, although participants demonstrate theoretical awareness of Fast Mapping and its alignment with communicative competence, classroom implementation is limited by exam-driven curricula, minimal mentoring, and restricted exposure to learner-centered pedagogies. Fast Mapping proved most effective when combined with visual scaffolds, peer collaboration, and context-rich dialogue; however, teachers in rural schools remained disadvantaged due to large class sizes and digital inequity. The study recommends embedding Fast Mapping into pre-service training through microteaching and reflective supervision and calls for targeted policy interventions to reduce resource disparities. These findings contribute to applied linguistics and teacher education and provide a foundation for future research on technology-enhanced, cognitively informed vocabulary instruction.

Keywords: Fast-Mapping Strategy; Hunan; Middle School; Pre-service teachers, vocabulary,

1. Introduction

Vocabulary teaching is a core component of effective English as a Foreign Language (EFL) learning, particularly in non-native contexts such as China. Learners' ability to communicate fluently and comprehend texts depends significantly on the breadth and depth of their vocabulary knowledge (Karafkan et al., 2022; Li & Kirby, 2015).

Traditional methods, including word lists and translation exercises, often fail to promote long-term retention, prompting interest in cognitively informed strategies that foster meaningful engagement. Among these, fast mapping, originally studied in child language acquisition, has been adapted for EFL classrooms as a strategy for inferring word meanings from minimal exposure and contextual inference (Wu et al., 2025).

While fast mapping has demonstrated potential to accelerate vocabulary learning, the knowledge pre-service teachers possess about this strategy and their capacity to implement it effectively in middle school classrooms remain underexplored (Karafkan et al., 2022).

Fast mapping allows learners to form rapid word–meaning associations through limited exposure, often in incidental or indirect learning contexts (K. M. Tahat et al., 2024). Its use has been expanded from first-language acquisition to second and foreign language classrooms, aligning with communicative language teaching and constructivist principles that support learner autonomy and contextual meaning-making (Sun & Yin, 2022).

In middle schools in linguistically homogeneous regions like Hunan Province, fast mapping provides an alternative to repetitive grammar-translation methods. Its successful implementation, however, depends on teachers' pedagogical knowledge, classroom management skills, and ability to design tasks that support strategic inference and contextual engagement (Xu & Lu, 2024).

Moreover, teacher cognition, beliefs, and prior experiences are crucial in adopting innovative strategies. Studies indicate that pre-service teachers' pedagogical beliefs and institutional support strongly influence their willingness to apply learner-centered approaches (Scogin et al., 2023). Similarly, in East and Southeast Asia, research on autonomous vocabulary learning often emphasizes student outcomes rather than teacher knowledge and classroom practices (Xu & Lu, 2024).

In Hunan, most literature focuses on exam-driven teaching and policy reforms, overlooking how pre-service teachers apply cognitively grounded strategies such as fast mapping.

Hence, this study asks: What knowledge do pre-service EFL teachers have in Fast Mapping-based vocabulary teaching process? It further aims to assess the depth and scope of their understanding and to examine the pedagogical and contextual challenges influencing classroom implementation. By focusing on teacher cognition, beliefs, and experiences, the study bridges the gap between theoretical knowledge and practical application within rigid curricular systems and high-stakes testing environments.

The findings provide insights for improving teacher education programs and curriculum design, guiding targeted training that strengthens pedagogical competence, fosters learner-centered vocabulary instruction, and equips future EFL teachers to implement cognitively and communicatively grounded strategies effectively in middle school classrooms.

2-Literature review

2.1 Pre-Service Teachers' Knowledge and Challenges in Fast-Mapping–Based Vocabulary Instruction

Understanding preservice EFL teachers' knowledge of fast-mapping–based vocabulary instruction is critical for assessing their readiness in middle school contexts. Teacher education research highlights preservice preparation as a key stage for developing pedagogical content knowledge, instructional decision-making, and awareness of cognitively informed teaching strategies (Khine & Liu 2022). In EFL classrooms, teachers are expected to integrate

linguistic competence with learner-centered, cognitive approaches to vocabulary (Raikhel, 2025).

Fast mapping requires understanding how learners form rapid word–meaning associations from limited exposure. Yet research indicates that preservice teachers' knowledge is often fragmented and largely theoretical. Phopayak, (2022) note that teachers may recognize vocabulary learning as contextual but lack practical strategies for classroom implementation. Wu et al. (2025) similarly report that many teachers possess only surface-level awareness of fast mapping, struggling to embed it systematically into lessons.

Structural constraints exacerbate this gap. Overcrowded classrooms and rigid curricula limit experimentation and feedback opportunities (Ajani, 2024). Digital inequality further restricts access to multimodal tools that support cognitive strategies (Xu & He, 2023).

Nevertheless, targeted support through microteaching, reflective practice, and structured training strengthens preservice teachers' conceptual clarity and instructional confidence, enabling more effective application of fast mapping (Fathi & Ebadi, 2020; Neuman & Danielson, 2021; Salihoğlu et al., 2022).

2.2 Vocabulary Teaching Strategies in English as a Foreign Language Contexts

Vocabulary instruction is central to middle school EFL education, where learners transition from basic to intermediate proficiency (Elmahdi & Hezam, 2020).

Traditional approaches, such as word lists and rote memorization, remain common, yet research increasingly emphasizes cognitively engaging, context-based methods. Hulstijn (2003) distinguishes incidental from intentional learning, demonstrating that intentional exposure combined with meaningful communicative tasks enhances retention. Ek and Niva (2024) further confirm that such strategies are particularly effective for adolescents encountering abstract or academic vocabulary(Habes et al., 2023; Salloum et al., 2019). Consequently, techniques like semantic mapping, keyword approaches, and fast mapping are promoted for their ability to support cognitive processing and lexical accuracy(Habes, Alanani, et al., 2024; D. N. Tahat et al., 2023).

Interactive strategies, including peer-assisted learning, task-based instruction, and vocabulary games, enhance engagement and encourage experimentation with language. Liu et al. (2021) report these methods foster learner autonomy and risk-taking, while Arslan (2024) shows improved long-term retention when vocabulary is integrated with speaking and writing.

However, in Hunan, overcrowded classrooms exceeding 50 students limit opportunities for interaction, constraining the application of these strategies and highlighting gaps in preservice teachers' procedural knowledge.

Technological integration offers multimodal input and immediate feedback, improving vocabulary outcomes (Hasan et al., 2022; Xodabande et al., 2023). Yet digital inequality in rural Hunan restricts preservice teachers' access and training, limiting practical implementation. Under these conditions, fast mapping emerges as a cognitively grounded, low-resource strategy, enabling teachers to support rapid word–meaning associations even in large or resource-limited classrooms, provided they understand its cognitive principles and contextual adaptation.

Consequently, Table 1 summarizes the core vocabulary teaching strategies applied in middle school EFL contexts, highlighting instructional focus, learner engagement, and contextual feasibility.

Table 1: Vocabulary Teaching Strategies in Middle School EFL Classrooms (Hunan Context)

Strategy Type	Instructional Focus	Learner Engagement	Practical Notes
Traditional (word lists, rote memorization)	Repetition of target words	Low; passive learning	Common in exam-driven settings; limited retention and contextual use
Cognitively Oriented (semantic mapping, keyword method, fast mapping)	Meaning-based associations, linking new words to known concepts	Moderate to high; encourages mental processing	Fast mapping suitable for large or resource-limited classrooms; supports rapid word learning
Interactive/Communicative (peer-assisted learning, vocabulary games, task-based instruction)	Collaborative tasks, speaking and writing integration	High; fosters autonomy and experimentation	Often constrained by overcrowded classrooms (>50 students) and digital inequity in rural schools
Technologically Enhanced (digital flashcards, apps, AR-based tools)	Multimodal input and immediate feedback	High; adaptive to individual pace	Limited in rural Hunan due to insufficient access and training; effective where infrastructure allows

Developed by the authors (2026).

2.3 Communicative Competence as a Pillar of Fast-Mapping–Based Vocabulary Teaching

Communicative competence underpins contemporary EFL pedagogy by emphasizing functional and contextually appropriate language use rather than grammatical accuracy alone. Building on Chomsky's (1965) distinction between competence and performance, Hymes (1972) introduced sociocultural appropriateness, and Canale and Swain (1980) framed it in four dimensions: grammatical, sociolinguistic, discourse, and strategic competence. Within vocabulary instruction, this framework situates lexical knowledge in meaningful interaction rather than isolated memorization (Chen, 2024). Preservice teachers' understanding of communicative principles is thus essential for implementing cognitively informed strategies such as fast mapping(Bdoor & Habes, 2024).

Empirical evidence shows that communicative, task-based approaches enhance vocabulary retention, transfer, and learner engagement in middle school contexts (Triwibowo, 2023; Chen, 2024). Fast mapping, which enables rapid word–meaning associations through minimal exposure, depends on interactional support to be effective. Wu et al. (2025) found that dialogue-based fast mapping significantly improves both lexical acquisition and pragmatic use, while Triwibowo (2023) demonstrated stronger retention when preservice teachers embedded fast mapping in collaborative tasks.

However, Hunan's exam-oriented curricula and limited digital infrastructure constrain preservice teachers' capacity to integrate communicative and fast-mapping strategies. These findings suggest that effective application of fast mapping requires not only cognitive strategy knowledge but also a

firm grasp of communicative and strategic competence to align classroom interaction with learning goals.

2.4 Fast Mapping as a Vocabulary Teaching Strategy in Second Language Classrooms

Fast mapping is a rapid cognitive process enabling learners to form initial word–meaning associations from minimal exposure. First identified in first-language acquisition (Carey & Bartlett, 1978), it has since been applied in EFL contexts Li and Tong (2020) demonstrated that Chinese learners could infer meanings with limited input, though retention declined without reinforcement, highlighting the need for scaffolding and repeated exposure. Recent research emphasizes embedding fast mapping within communicative and task-based instruction. "The key elements of fast mapping as a vocabulary teaching strategy, along with associated challenges and pedagogical supports, are summarized in Table 2."

Table 2: Fast Mapping Implementation in EFL Classrooms – Key Elements, Challenges, and Supports

Element	Description	Classroom Challenges	Teacher Supports
Cognitive Process	Rapid word–meaning association from minimal exposure	Limited attention span; need for repeated exposure	Scaffolding, contextual examples
Instructional Methods	Task-based, collaborative, explicit encoding	Lack of materials; large class sizes	Practice-based training; guided modelling
Contextual Constraints	Scarcity of localized, contextually relevant materials	Reduced meaningful associative learning	Resource adaptation; digital/visual aids
Teacher Skills & Training	Pedagogical competence, feedback, repetition	Low linguistic proficiency	Systematic training; mentorship; AR/spaced repetition tools

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Furthermore Wang et al. (2021) found that combining fast mapping with explicit encoding and contextual tasks improved vocabulary acquisition and spontaneous use compared to traditional drills. Tuyan (2023) similarly reported that preservice teachers who incorporated fast mapping into collaborative activities, such as paired dialogue and discussions, facilitated both rapid uptake and sustained retention. However, in Hunan middle schools, preservice teachers' knowledge of fast mapping is often constrained by the scarcity of localized, contextually relevant materials, limiting meaningful associative learning.

Teacher-related factors further affect efficacy. Wu et al. (2025) note that low linguistic proficiency reduces teachers' capacity to provide rich input, while Maxim and Brown (2023) emphasize the importance of elaboration, repetition, and corrective feedback. Targeted teacher education including systematic training, visual or digital support, and practice-based modules enhances retention and application (Sun & Yin, 2022; Toniolo et al., 2022; Andoh et al., 2022). These findings suggest that preservice teachers' effective use of fast mapping depends on both cognitive strategy knowledge and applied pedagogical skills within contextually rich environments.

2.5 Teacher Beliefs, Experiences, and Implementation of Fast Mapping

Preservice teachers' beliefs play a decisive role in shaping their knowledge and use of fast-mapping–based vocabulary instruction in EFL classrooms. Teacher cognition research indicates that beliefs about language learning strongly influence instructional decision-making (Hsiang

et al., 2023). In the Chinese EFL context, preservice teachers who conceptualize vocabulary learning as an active, context-driven process are more inclined to adopt cognitive strategies such as fast mapping rather than rote memorization (Sun, 2024). However, in examination-oriented environments like Hunan, strong belief in fast mapping's pedagogical value is often required to counter systemic resistance to innovation.

Teacher education experiences significantly mediate whether such beliefs translate into practice. Experiential training, including microteaching and strategy-focused modules, has been shown to enhance preservice teachers' confidence and adoption of fast mapping (Hsiang et al., 2023). Yet, fast mapping remains insufficiently embedded within many Hunan teacher preparation programs, limiting preservice teachers' applied knowledge.

Contextual constraints further restrict implementation. Large class sizes, exam-driven curricula, and limited instructional time discourage experimentation with innovative strategies (Jin,2024). Research shows that sustained use of fast mapping depends on mentoring, classroom modeling, and reflective practice, which strengthen self-efficacy and adaptive use (Albaqami, 2019). Positive student outcomes, in turn, reinforce preservice teachers' commitment to fast mapping and support its continued refinement (Jacobson, 2011). Given the above, the main factors influencing pre-service teachers' implementation of fast mapping, along with associated challenges and supports, are summarized in Table 3.

Table 3: Influences on Pre-Service Teachers' Implementation of Fast Mapping

Factor	Description	Barriers	Supports / Enhancers
Teacher Beliefs	Perception of FMS as valuable and context-sensitive	Exam-oriented environment; systemic resistance	Emphasis on cognitive engagement; belief in active learning
Teacher Education Experiences	Microteaching, strategy modules, experiential training	Limited exposure in curriculum; insufficient modeled examples	Peer feedback, guided planning, reflective practice
Contextual Constraints	Large classes, rigid curricula, limited instructional time	Restricts experimentation and feedback	Classroom modeling, mentoring, adaptive lesson planning
Reinforcing Factors	Positive student outcomes; reflective insights	Inconsistent student engagement	Success feedback, observation, reflective discussions

Developed by the authors (2026).

3-Methodology

This study employed an exploratory qualitative research design to investigate pre-service EFL teachers' experiences with the fast-mapping strategy for vocabulary instruction in Hunan middle school EFL classrooms (Al Olaimat et al., 2022, 2025; Habas et al., 2026; Habes, Almutawa, et al., 2024; Habes, Alzahrani, et al., 2024; Hadeed et al., 2024) Qualitative research was deemed most appropriate as it allows the researcher to explore the complexities of teachers' lived experiences, pedagogical beliefs, and instructional practices, which are interpretive rather than quantifiable phenomena (Creswell et al., 2007) The focus on pre-service teachers'

knowledge, perceptions, and classroom application of fast-mapping necessitates an approach that captures nuanced insights into cognitive and contextual processes, making qualitative inquiry particularly suitable (Denzin & Giardina, 2023; Ahmad & Wilkins, (2025)

Five pre-service teacher interns were purposively selected as participants due to their direct engagement in middle school EFL classrooms in Hunan during their practicum placements. This purposive sampling aligns with Lösch et al., (2023) recommendation that exploratory studies benefit from participants who are strategically positioned to provide rich, relevant data on the research topic. Each intern represented a distinct teaching context within Hunan, encompassing both urban and semi-urban schools, allowing for comparison of experiences under varying resource availability and classroom conditions. Selection criteria emphasized participants' recent exposure to fast-mapping pedagogy during teacher training programs, as well as their willingness to reflect critically on challenges, instructional decisions, and learner outcomes.

Data were collected through semi-structured interviews, allowing participants to describe their experiences in depth while maintaining alignment with the study's research question: What knowledge do pre-service EFL teachers have in fast-mapping–based vocabulary teaching processes? Interview protocols were designed following Castillo-Montoya's (2016) framework to ensure alignment with the research question and to maximize reliability and validity. Open-ended questions encouraged interns to discuss instructional planning, classroom application, student responses, and cognitive strategies employed when using fast-mapping, while follow-up prompts facilitated deeper exploration of challenges and reflective insights. Interviews were conducted in Mandarin, the participants' preferred language, and later transcribed and translated into English to preserve accuracy and contextual meaning.

The study adopted Cognitive Load Theory (CLT) as the guiding theoretical framework. CLT asserts that working memory has a limited capacity for processing new information, and instructional strategies must be designed to minimize extraneous load while maximizing germane cognitive processing (Sweller, et al., 2011; Rohde et al., 2023). In the context of vocabulary teaching, fast-mapping aligns with CLT principles by allowing learners to form rapid associations between new lexical items and meanings with minimal exposure. Interns reported that scaffolding techniques such as contextual grouping, visual aids, and repetition through communicative activities helped reduce cognitive overload, enabling learners to integrate new words more effectively. CLT also guided the analysis of challenges encountered by interns, such as balancing intrinsic cognitive load from complex vocabulary with limited instructional time and large class sizes.

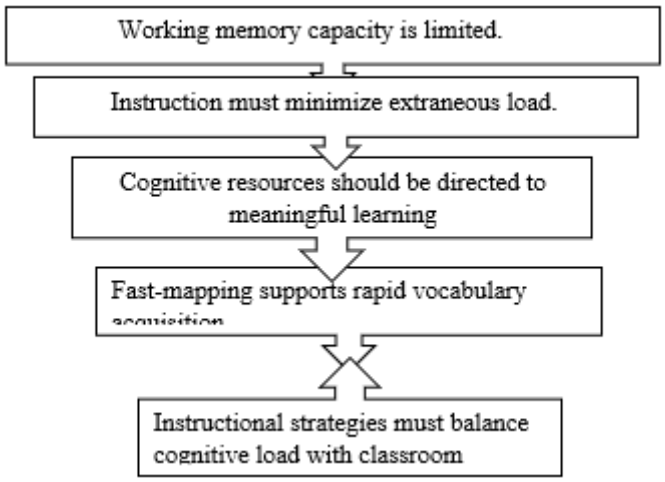
Thematic analysis was employed to analyze interview data, providing a systematic method to identify, interpret, and organize recurring patterns of meaning (Clarke & Braun, 2022). Data coding focused on three central themes: pre-service teachers' conceptual understanding of fast-mapping, the pedagogical strategies implemented, and the challenges influencing classroom application. Codes were iteratively reviewed, and themes were refined to reflect both commonalities and divergences across interns' experiences. The analysis emphasized the interplay between CLT-informed strategies and practical classroom realities, highlighting how cognitive principles were adapted in resource-constrained settings. For instance, interns described modifying task complexity or using peer-assisted learning to maintain learner engagement without overwhelming working memory, illustrating the operationalization of CLT in authentic classrooms.

Methodological rigor was ensured through multiple strategies. Verification involved thorough literature review and bracketing of the researcher's assumptions to reduce bias, while validation was strengthened through member checks, where interns reviewed and confirmed the accuracy of coded transcripts. Triangulation was achieved by cross-referencing interview data with institutional reports and teacher training

curricula to contextualize interns' experiences. Ethical considerations were prioritized by obtaining informed consent, maintaining anonymity, and securely storing all data. The small sample size was justified through the principle of information power, emphasizing depth, relevance, and specificity rather than numerical generalizability (Lakens, 2022).

The integration of CLT with qualitative inquiry allowed the study to investigate not only what pre-service teachers know about fast-mapping but also how they apply it in real classroom conditions. Findings provide insights into the cognitive and pedagogical strategies pre-service teachers use to enhance vocabulary acquisition, the constraints imposed by high-stakes curricula and large classes, and the ways interns adapt instruction to support effective learning. The study also addresses gaps in the literature by foregrounding teachers' perspectives, which are often overlooked in favor of learner outcomes, particularly in underrepresented regions such as Hunan. By examining the interaction between cognitive theory, pedagogical training, and classroom practice, the study contributes both theoretically and practically to understanding the implementation of fast-mapping strategies in EFL classrooms, offering implications for teacher education programs aiming to enhance vocabulary instruction through cognitively efficient and contextually responsive approaches. As explained above, the following diagram 1 illustrates the five all-encompassing key assumptions underpinning the theory.

Diagram 1: Key assumption underpinning the theory



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4-Discussion and Findings

4.1 Challenges in Implementing Vocabulary Strategies

The findings of this study reveal that pre-service teachers in Hunan middle school EFL classrooms navigate a highly complex instructional environment, balancing curriculum compliance with learner-centered engagement. These teachers are responsible not only for delivering content but also for facilitating cognitive development through adaptive vocabulary instruction, particularly for students transitioning from foundational to intermediate proficiency. As noted by Raikhel, (2025). and Ajani (2024), pre-service teachers are expected to meet curriculum demands while attending to the diverse developmental needs of learners. However, the study indicates that practical application of cognitively demanding strategies, such as the Fast-Mapping Strategy (FMS), is often constrained by systemic, structural, and cognitive challenges.

Underpinning these challenges, Intern 1 remarked:

"Balancing the curriculum while attempting to implement fast mapping was extremely difficult. I often had to focus on completing the syllabus rather than ensuring that students truly understood the words or could use them meaningfully, particularly when class time was limited and expectations were high."

Also, this reflection highlights how curriculum pressure increases extraneous cognitive load for learners, reducing the mental resources available for rapid word-meaning associations, as posited by Cognitive Load Theory (Sweller et al., 2011). In this context, the intern's struggle illustrates that structural demands can overwhelm both teacher planning and students' working memory, limiting effective vocabulary acquisition.

Concordantly, the study found that overcrowded classrooms significantly hinder FMS implementation. Large classes, frequently exceeding fifty students, reduce opportunities for individual monitoring and timely feedback, which are critical for reinforcing vocabulary retention. Intern 2 observed:

"Even when I wanted to use interactive activities or digital flashcards, the lack of devices and unstable internet meant I had to revert to word lists and translation exercises, which I knew were less effective in helping students retain vocabulary or use it in context."

This aligns with Xu & He, (2023), who argue that insufficient technological infrastructure and inadequate teacher training amplify extraneous cognitive load. Without appropriate scaffolding, students struggle to integrate new lexical items into existing knowledge, underscoring the intersection of contextual limitations and cognitive constraints. Similarly, socio-economic disparities across schools emerged as a key challenge. Intern 3 remarked:

"Students in urban schools have access to computers, apps, and interactive tools, but in my rural placement, I had no such resources. This made it very hard to apply the techniques we learned in university and forced me to rely on rote learning methods."

As observed by Ajani (2024), inequitable access to resources limits opportunities for cognitively oriented pedagogy. From a CLT perspective, the lack of multimedia tools or visual scaffolds increases cognitive load while reducing opportunities for germane processing, making FMS less effective in resource-constrained classrooms.

Highlighting potential mitigations, the study shows that structured interventions in teacher education can partially offset these challenges. Intern 4 reflected:

"Through microteaching and guided planning sessions, I gradually felt more confident using fast mapping. Seeing how students responded to context-based vocabulary activities helped me believe that I could implement these strategies even in larger classes."

This supports Fathi and Ebadi (2020) and Salihoğlu et al. (2022), who emphasize that guided practice and reflective supervision enhance pedagogical efficacy. In CLT terms, scaffolded microteaching reduces extraneous load for both teacher and learner while promoting germane cognitive processing through practical rehearsal.

Reinforcing the importance of mentorship, Intern 5 stated:

"Feedback from my supervisor during practicum was invaluable. It helped me adjust activities to suit students' proficiency levels, and I learned ways to simplify fast mapping exercises without compromising their cognitive effectiveness."

This statement illustrates that targeted supervision enables pre-service teachers to align instructional design with CLT principles, optimizing working memory use while maintaining the cognitive challenge required for effective vocabulary acquisition. Contrastingly, despite strategy training, large class sizes and strict curriculum timelines persist as barriers. Intern 1 additionally noted:

"Even when we knew how to implement fast mapping effectively, the syllabus pressure and number of students meant that there was often no time for interactive exercises, so I defaulted to memorization and repetition."

Such constraints demonstrate how intrinsic cognitive load, if combined with high extraneous load from structural pressures, can overwhelm students' working memory, limiting the practical application of fast-mapping strategies.

Overall, the evidence suggests that pre-service teachers possess foundational knowledge of FMS and understand the cognitive principles underpinning vocabulary learning. Yet, systemic inequities, resource limitations, and structural pressures significantly shape their capacity to translate knowledge into effective classroom practice. By explicitly linking Cognitive Load Theory with classroom realities, this study underscores the importance of institutional support, reflective mentorship, and contextually adaptive strategies to optimize cognitive processing and enable successful implementation of fast-mapping pedagogy in diverse Hunan middle school contexts.

4.2 Vocabulary Strategy Implementation in Hunan's EFL Classrooms

The findings indicate that pre-service teachers in Hunan middle school EFL classrooms face significant challenges when implementing vocabulary instruction that aligns with communicative and cognitively informed pedagogical paradigms. As noted by Elmahdi and Hezam (2020) and Ek and Niva (2024), adolescent learners transitioning to intermediate proficiency benefit more from intentional, strategy-based instruction than from rote memorization. However, structural limitations, particularly overcrowded classrooms, restrict opportunities for interactive activities such as vocabulary games, peer discussions, and group work. Intern 1 reflected:

"In my class of fifty students, I wanted to do group vocabulary activities, but it was impossible to monitor all students, so I fell back on word lists and translation drills."

This observation underscores how intrinsic cognitive load from complex lexical items is compounded by extraneous load arising from classroom management demands, consistent with Cognitive Load Theory (CLT) (Sweller, et al.,2011). Without adequate scaffolding, students struggle to process and retain new vocabulary efficiently.

Digital inequities further exacerbate these challenges. While digital tools such as flashcards, vocabulary apps, and augmented reality have been shown to enhance lexical retention (Hasan et al., 2022; Xodabande et al., 2023), access remains uneven across urban and rural schools. Intern 3 noted:

"In my rural placement, there were no tablets or apps available, and I had little training on using technology even if it were present. I had to rely on paper exercises, which felt less engaging for students."

This reflects how limited technological infrastructure and inadequate professional development restrict the effective adoption of cognitively supportive strategies, increasing extraneous load and reducing learners' opportunities for germane processing, as explained by CLT.

Despite these constraints, fast mapping emerges as a pedagogically efficient and adaptable approach. By enabling learners to form rapid associations between new and known words with minimal exposure, it reduces cognitive overload and supports vocabulary retention even in large or resource-constrained classrooms. Intern 2 remarked:

"Using fast mapping with contextual examples worked even without digital tools. Students could guess word meanings from sentences, and repeating the words in different contexts seemed to help them remember better."

This aligns with Hasan et al. (2022) and Xodabande et al. (2023), who emphasize that strategy-based, contextually reinforced instruction enhances both retention and motivation. By integrating CLT principles, fast mapping allows teachers to optimize working memory usage, scaffolding learning in a way that is feasible despite infrastructural or class-size limitations. Consequently, this strategy provides pre-service teachers with a flexible, cognitively grounded tool to navigate the complexities of Hunan EFL classrooms, balancing practical constraints with effective vocabulary acquisition.

4.3 Communicative Competence and Vocabulary Pedagogy in Hunan EFL Classrooms

The findings reveal that while pre-service teachers in Hunan possess conceptual awareness of communicative competence, particularly its

four core dimensions as theorized by Canale and Swain (1980), their classroom practices often fail to fully operationalize these principles. Institutional pressures associated with exam-oriented curricula continue to shape instructional decision-making, resulting in vocabulary instruction that prioritizes rote memorization over meaningful language use. Lexical teaching was frequently decontextualized, limiting learners' opportunities to apply new words in authentic communicative tasks. As noted by Cirocki and Farrell (2019), test-driven environments often produce a disjunction between the theoretical knowledge imparted in teacher education and its practical realization, particularly in the domain of vocabulary pedagogy.

Underpinning these challenges, Intern 1 reflected:

"I knew from my training that students should use new words in dialogue or stories, but with the exams coming, I felt compelled to focus on definitions and memorization exercises instead."

This testimony illustrates the tension between pedagogical theory and curricular constraints, reflecting how extraneous load, as explained in Cognitive Load Theory (CLT), can impede the effective application of cognitively demanding strategies such as fast mapping in high-pressure classrooms.

In line with this, the findings indicate that pre-service teachers who attempted to embed cognitive strategies like fast mapping within communicative activities experienced enhanced classroom engagement and more efficient vocabulary acquisition. When integrated into context-rich tasks—such as dialogue exchanges, role plays, or group projects—fast mapping facilitated rapid word retention while promoting pragmatic and flexible language use. Intern 2 observed:

"Using fast mapping in group dialogues helped students remember words and use them correctly. They were more confident speaking because they could connect new words to familiar sentences immediately."

These outcomes corroborate the work of Wu et al. (2025) and Triwibowo (2023), demonstrating that strategy-based, cognitively aligned approaches foster both retention and communicative competence.

However, the effectiveness of such integration was strongly influenced by contextual factors. Pre-service teachers in urban schools, with greater access to technological and instructional resources, reported smoother implementation and more dynamic student participation. Conversely, rural placements faced significant limitations in digital infrastructure and teacher training, constraining the adoption of interactive, student-centered approaches. Intern 3 highlighted:

"In my rural school, we had no tablets or projectors. Even if I wanted to design communicative tasks with fast mapping, the lack of resources forced me to rely on drills and repetition."

From a CLT perspective, these resource limitations increase extraneous cognitive load, making it more difficult for learners to process and retain new vocabulary efficiently, while also reducing opportunities for germane processing that underpins communicative skill development.

Extending this analysis, the study emphasizes the importance of practice-based professional development for enhancing communicative competence. Programs incorporating microteaching, context simulation, and structured feedback equip pre-service teachers with the strategic flexibility and pedagogical resilience necessary to navigate resource disparities and curriculum pressures. Intern 4 remarked:

"Microteaching sessions allowed me to try fast mapping in small groups, see how students responded, and adjust my activities before doing it in a real class. It gave me confidence despite large classes."

This aligns with Songsiengchai (2019), who asserts that experiential preparation cultivates instructional adaptability, enabling teachers to reconcile high-stakes assessment demands with learner-centered pedagogy.

Overall, the findings indicate that while pre-service teachers in Hunan are theoretically informed about communicative competence, successful vocabulary pedagogy requires the practical application of cognitive strategies like fast mapping within supportive, context-aware frameworks. Integrating CLT principles into lesson design allows teachers to manage cognitive load effectively, optimize working memory, and enhance both lexical retention and communicative ability, even within structurally constrained environments.

4.4 Pedagogical Adaptation of Fast Mapping in Hunan's Middle School English Classrooms

The findings reveal that while fast mapping presents significant potential as a strategy for vocabulary acquisition, its effectiveness in Hunan middle schools is shaped by contextual and pedagogical limitations. Although pre-service teachers are introduced to fast mapping during teacher training, many lack accesses to locally relevant materials that facilitate meaningful semantic associations, which are critical for rapid word learning. Vocabulary instruction remains heavily dependent on outdated textbooks and decontextualized word lists, restricting opportunities for students to integrate new lexical items into authentic communication. This aligns with Wu et al. (2025) and Maxim and Brown (2023), who emphasize that vocabulary uptake is optimized when learners receive interactive, context-rich exposure.

Highlighting these constraints, Intern 1 observed:

"Even though we were trained in fast mapping, the textbooks often had isolated word lists with no context. I struggled to create activities that allowed students to use new words naturally."

This testimony underscores the gap between theoretical knowledge and practical classroom application, illustrating how Cognitive Load Theory (CLT) is relevant: limited contextual cues increase extraneous load, reducing learners' capacity to form rapid lexical associations.

The study further identifies disparities in pre-service teacher proficiency, particularly among trainees from rural or non-elite institutions, which impedes their ability to provide spontaneous linguistic elaboration essential for fast mapping**.** Intern 2 noted:

"I sometimes reverted to translations because I wasn't confident explaining meanings in different ways. My students got the words but rarely used them independently."

This reinforces the notion that teachers' expressive competence directly affects learners' cognitive processing and vocabulary retention, supporting CLT principles.

Additionally, the findings indicate a need for curriculum reforms that better connect strategic theory with practical implementation. Innovations such as AR-assisted storytelling and spaced repetition, endorsed by Sun and Yin (2022) and Toniolo et al. (2022), remain underutilized due to limited digital literacy and contextual adaptation. Intern 3 said:

"We were told about using apps and interactive storytelling, but I had no training or local materials to make these works in my class."

Strengthening pre-service teachers' communicative and cognitive pedagogical skills, alongside providing culturally and linguistically relevant resources, is therefore essential to fully realize the potential of fast mapping in Hunan's EFL classrooms.

5. Conclusion

This study critically examined the integration of the Fast Mapping Strategy (FMS) within vocabulary instruction in Hunan middle school EFL classrooms, focusing on pre-service teachers' knowledge, beliefs, and pedagogical adaptations. Guided by Cognitive Load Theory (CLT), the research investigated how pre-service teachers negotiate the dual demands of curriculum compliance and learner-centered engagement while implementing cognitively oriented vocabulary strategies. By exploring the experiences of five purposively selected pre-service teacher interns, the study illuminates the interplay between theoretical understanding,

instructional beliefs, and contextual constraints in shaping the practical application of FMS across urban and rural classroom settings.

The study explored pre-service teachers' conceptual knowledge of fast mapping, revealing that while foundational understanding is present, its classroom enactment is heavily influenced by systemic inequities, resource disparities, and institutional pressures. This highlights the persistent gap between pedagogical theory and practice, particularly in under-resourced schools, and underscores the significance of teacher beliefs in enabling strategy adoption. Pre-service teachers who value interactive, cognitively engaging instruction were more inclined to implement fast mapping, demonstrating how belief-driven pedagogy serves as a critical enabler in challenging teaching contexts.

Moreover, the research considered the constraints of exam-driven, high-stakes educational environments, identifying structural and technological limitations that impede communicative and cognitively informed vocabulary instruction. It provides insight into the role of teacher education programs, emphasizing that experiential learning, reflective supervision, scaffolded lesson planning, and culturally relevant teaching materials are essential for equipping pre-service teachers to translate fast mapping knowledge into practice. By foregrounding teachers' perspectives, this study contributes to a growing body of research often dominated by learner-focused outcomes.

In practical terms, the findings support curriculum reforms that integrate CLT principles with communicative competence frameworks, fostering pedagogical flexibility and enhancing vocabulary acquisition. The study demonstrates that evidence-based, contextually adaptive strategies like fast mapping can be effectively operationalized when pre-service teachers are provided with appropriate training, resources, and mentoring.

Lastly, this research provides a comprehensive understanding of how pre-service teachers acquire, adapt, and implement fast mapping strategies within diverse and resource-constrained EFL classrooms in Hunan. It offers valuable theoretical and practical insights for teacher education, highlighting the synergy between cognitive theory, instructional beliefs, and classroom realities to improve vocabulary teaching outcomes.

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