# Enhancing Mastery of Mandarin Interrogative Words via Mind Mapping: A Pilot Study

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## ABSTRACT

This research explores the integration of mind mapping techniques which is grounded in Tony Buzan's cognitive theory into the pedagogical framework of Mandarin interrogative word acquisition. In an increasingly globalised educational landscape, traditional linear methods often prove insufficient for helping learners organise complex linguistic information. This study addresses the cognitive challenges of vocabulary retention and conceptual mastery by proposing a systematic visual framework. Utilising a one-group pretest-posttest quasi-experimental design with 20 undergraduate participants, the study demonstrates that graphical classification significantly enhances contextual awareness and self-learning skills. Results indicate a substantial increase in average assessment scores from 4.25/10 to 7.05/10 which showed an approximate 66% improvement in learners' ability to use Mandarin interrogative words accurately. Hence, it suggests that mind maps facilitate a more intuitive and effective mastery of Mandarin interrogative systems.

Keywords: Mind map, interrogative words, Mandarin language acquisition, pedagogical innovation, cognitive scaffolding.

## INTRODUCTION AND PROBLEM STATEMENT

### Background of the study

In the contemporary globalised landscape, the acquisition of a second language has emerged as an indispensable skill for cross-cultural communication. This necessity is aligned with the United Nations' Sustainable Development Goal (SDG) 4 which advocates for quality education through the implementation of innovative instructional tools. One such tool is the mind map which is a non-linear and intuitive learning aid first introduced by psychologist Tony Buzan. Mind mapping facilitates the visual organisation of thoughts and information through a radiant structure that mimics natural cognitive processing. Consequently, it enhances understanding and memory retention.

### Problem statement

Language acquisition is a complex and long-term endeavour requiring sustained motivation. However, many second-language learners struggle with engagement due to the perceived difficulty of the subject. Within the context of Mandarin Chinese, interrogative words serve as a fundamental pillar for effective communication. Despite their importance, empirical data from University of Teknologi MARA (UiTM) reveal that learners face significant barriers in this area with only 35% of students managing to score 50% or above in Mandarin

assessments. Learners frequently encounter difficulties in applying interrogative words during authentic interactions and perform poorly in written tasks requiring the creation of interrogative sentences. Therefore, the integration of a specialized mind map model is proposed as a targeted intervention to aid in the mastery and retention of Mandarin interrogative vocabulary.

### Objectives

The primary aim of utilising mind maps is to enhance a learner's proficiency in employing Mandarin interrogative words. The specific objectives are as follows:

1. To increase vocabulary retention by utilising a central theme linked to interrogative terms through specialised branches

2. To elucidate vocabulary concepts so learners can visualise the functional relationships between different interrogative words

3. To construct a systematic interrogative framework by presenting various word types and their respective usages.

4. To enhance reading comprehension by visualising core themes and keywords

## LITERATURE REVIEW

Research has shown that mind mapping is an effective tool in language education. Wang and Sun (2018) found that mind mapping techniques help students learn vocabulary better by organising the relationships between words visually. A key study by Fan (2017) also explains that mind mapping is a strong cognitive tool for building semantic networks. It helps learners move away from simple memorisation and toward a better understanding of how words are connected. In Mandarin learning, Fan (2017) argues that visual maps can reduce the cognitive load or mental effort needed to learn difficult grammar. Consequently, it allows students to focus more on how to use the language in real life.

Other recent studies also show the benefits of this visual method. A review by Zheng et al. (2025) found that mind mapping is very helpful for remembering vocabulary, improving reading comprehension and preparing for writing tasks. In the field of Teaching Chinese as a Foreign Language (TCFL), Gong (2020) suggests that visual tools help students connect abstract grammar rules with practical communication. Similarly, Mellania and Sakti (2022) found that using digital mind maps helps Mandarin students improve their writing logic and organisation.

Although there is a lot of research on using mind maps for general vocabulary and writing, there is still a research gap regarding its specific use for Mandarin interrogative words. Interrogative words or question words are the key points of communication but they are often difficult for students to master because they involve complex rules and different contexts. While previous researchers have proven that visual tools work for general learning, this study aims to fill that gap at how these tools can help students master specific grammar parts like question words. By using the ideas of semantic networks from Fan (2017) and the evidence from Zheng et al. (2025), this research creates a targeted way to learn. It focuses on the practical application of interrogative words through a semantic gear framework by moving from general vocabulary learning to specific grammar mastery.

## METHODOLOGY

### Research design

Since this study involved a quantitative retrospective analysis data, the study employed a one-group pre-test-post-test quasi-experimental design to measure the impact of the instructional intervention. The sample consisted of 20 undergraduate learners from various academic courses at the University of Teknologi MARA(UiTM) in Sarawak, Malaysia.

### Research instrument

The primary instrument was the "Mandarin Interrogative Words Mind Map" (Figure 1) which is a copyrighted pedagogical tool (CRLY2024Q00922). The instrument utilises a radiant structure featuring a central node that branches into eight semantic categories of Person, Object, Numbers, Occupation, Place, Date/Time, Action and Explanation. Each branch integrates Hanzi, Pinyin and English translations with representative situational imagery to foster multimodal learning.

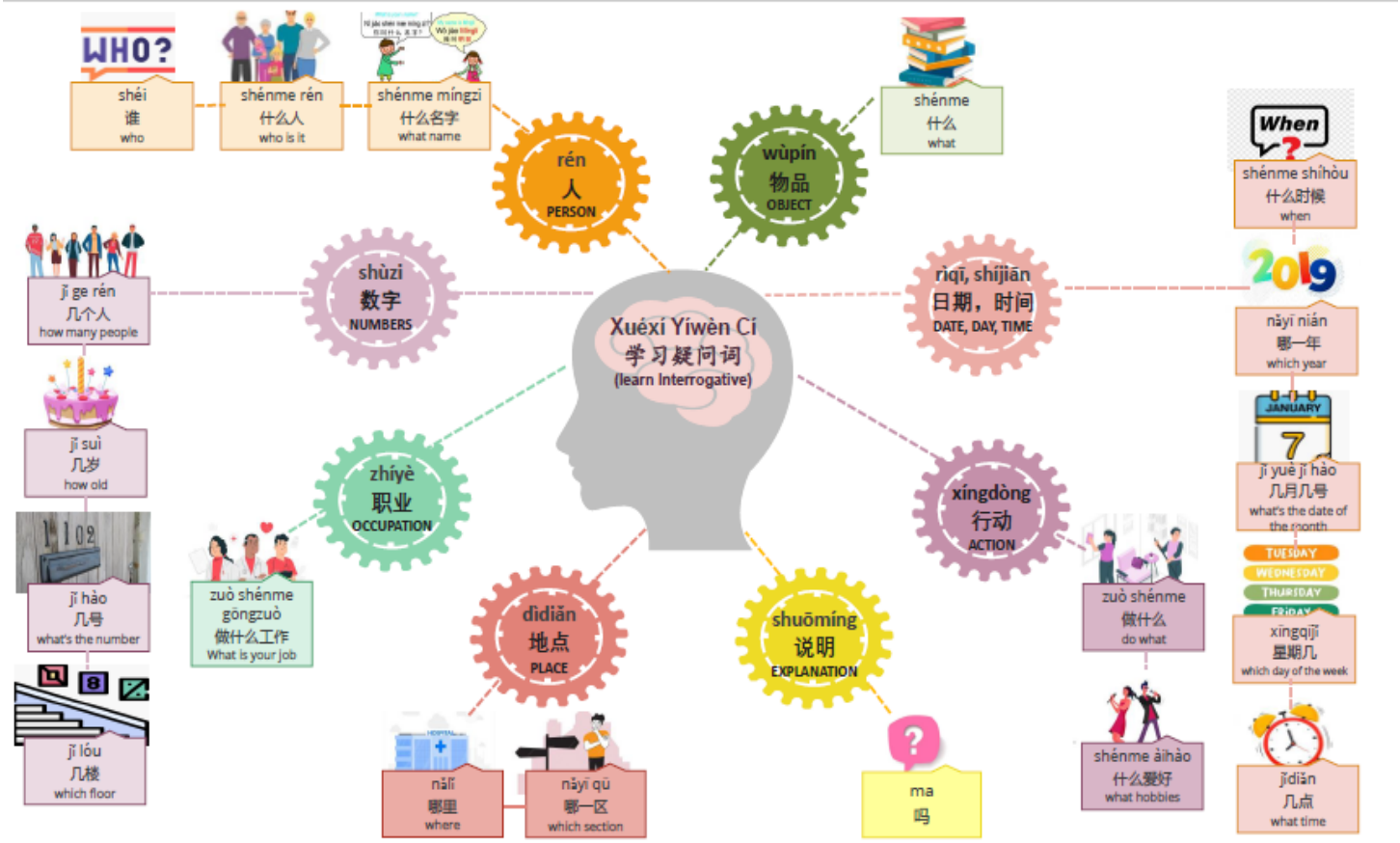


Figure 1. Mandarin Interrogative Words

### Procedure

The study was conducted over a structured four-week period. During the initial phase, a pre-test was administered to establish a performance baseline. In the intervention phase, the mind map was formally integrated into classroom instruction, and learners were encouraged to utilise the tool for autonomous self-study. Finally, a post-test was administered to quantify improvements in mastery and conceptual understanding.

## RESULTS AND DISCUSSION

### Quantitative analysis of learning gains

The empirical data collected from the 20 undergraduate participants demonstrate a substantial enhancement in linguistic performance following the instructional intervention. As illustrated in the comparative analysis of assessment scores, the cohort's average performance rose from an initial baseline of 4.25/10 to a post-intervention mean of 7.05/10. This represents an approximate 66% improvement in the learners' ability to accurately utilise Mandarin interrogative words. Individual trajectories further demonstrate the effectiveness of the mind map model. For high achievers, Candidate 17 (C17) reached a top post-test score of 9/10 by building on a strong pre-test score of 8/10. Even more significant gains occurred among students who initially struggled. For example, Candidate 1 (C1) and Candidate 2 (C2) both started with a baseline of 2/10 but leaped to 7/10 and 8/10 respectively after the intervention. This trend shows how the Mandarin interrogative mind map supports mastery across all proficiency levels.

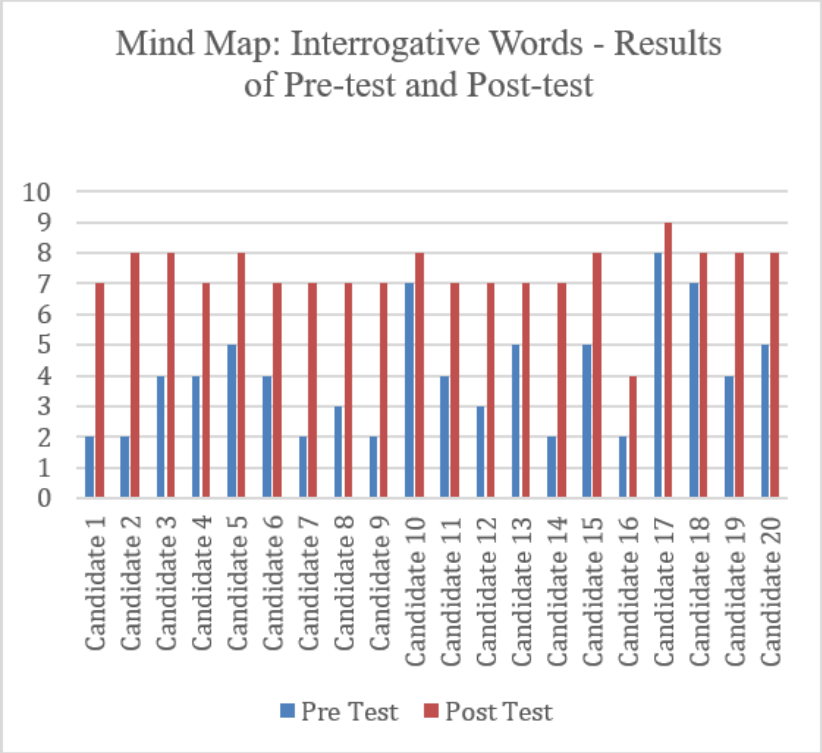


Figure 2. Results of Pre-test and Post-test

**Cognitive scaffolding and system building**

The findings provide robust support for the role of mind maps as a cognitive scaffold in language acquisition. By transforming abstract vocabulary into a graphical and non-linear system based on Tony Buzan's theory, the intervention allowed learners to move beyond the limitations of rote memorisation.

The structured use of branches and association lines assisted learners in building an internal interrogative word system that clarified the usage and classification of different question types. By visualising themes and keywords, the tool significantly improved reading efficiency and allowed students to recall associations more intuitively. This visual method enhanced long-term retention while simultaneously stimulating the creative ability of learners to apply these words in both real-world contexts and academic examinations.

**Comparative analysis with existing pedagogical tools**

The superiority of this specialised mind map model (Copyright: CRLY2024Q00922) lies in its holistic approach to grammar. Unlike mainstream mobile applications or traditional textbooks that often present knowledge in an atomized or linear path, this intervention offers a comprehensive perception of the linguistic system.

The multimodal advantage of this approach lies in its use of semantic branches and combined image-text elements, which provide multi-dimensional cognitive cues that flashcard-based tools focused on isolated translation often lack. This innovation offers targeted visualisation to fill existing gaps in grammatical instruction to directly addressing specific challenges where 65% of learners previously failed to reach a 50% score threshold. The systematic use of mind maps demonstrates clear methodological superiority over traditional decentralised learning methods by offering an inventive way for learners to understand, classify and utilise interrogative words effectively.

## CONCLUSION AND RECOMMENDATIONS

**Conclusion**

The integration of mind maps as a primary learning tool for Mandarin interrogative words effectively fulfills the objective of enhancing learner understanding and mastery. By transitioning from traditional rote memorisation

to a visual and non-linear approach, the intervention provides a significantly more engaging and efficient pedagogical method.

The study demonstrates that the use of a systematic mind map stimulates the learners' ability to apply interrogative vocabulary accurately within practical and authentic contexts. Ultimately, this visual methodology assists learners in effectively processing, understanding, and memorising a substantial volume of vocabulary through a creative and intellectually stimulating process. The significant increase in post-test scores confirms that the Mandarin interrogative mind map serves as a vital instrument for improving both contextual awareness and long-term vocabulary retention.

**Recommendations**

Based on the positive outcomes of this pilot study, several recommendations are proposed for language educators and future researchers. Language departments should consider incorporating visual thinking tools, such as the copyrighted Mandarin interrogative mind map, into the standard syllabus to better support diverse learning styles. Future efforts could also focus on adapting these mind maps into interactive digital platforms to increase learner participation and motivation. Researchers should conduct longitudinal studies with larger sample sizes to evaluate the long-term retention of interrogative word mastery and its broader impact on communicative fluency.

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