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Supervisor Dr. Sonali Nag
Subject keywords Intervention, Pilot Study, Literacy, Morphology, Vocabulary
Research methods used Mixed Methods Quant: ANOVA, t-test, Person's Correlation Qual: Interview, thematic review

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List of Abbreviations

ANOVA	Analysis of Variance
BERA	British Educational Research Association
BPS	British Psychological Society
CAT	Cognate Awareness Test
CUREC	Central University Research Ethics Committee
DPIA	Data Protection Impact Assessment
ILTR	Institute of Language Teaching and Research
LCT	Lexical Compounding Task
MA	Morphological Awareness
WDT	Word Definition Task

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Abstract

Approximately 80% of the Chinese modern vocabulary are compound words. Because of this characteristic, Chinese lexical morphology also focuses highly on compound words. The study's purpose was to investigate a Mandarin Chinese vocabulary intervention that trained lexical compounding awareness in third-graders to explore if targeted lexical compounding awareness training can improve vocabulary depth. The study was conducted in a low-income community in rural China where academic achievement falls below the national average. The study hopes to provide insight into the feasibility of vocabulary interventions in diverse settings in China. Participants were 57 third-grade students from rural China. A mixed-methods design was adopted to address research questions: a within-subject quasi-experimental design aimed to evaluate the effectiveness of the intervention of morphological awareness and vocabulary depth, and a thematic analysis of teacher interviews explored teachers' experiences of the intervention. The research questions looked at: 1. Does an intervention that focuses on systematically instructing on Chinese compound lexical structures affect third graders' Chinese vocabulary knowledge? Specifically, a) Does targeted training in Chinese compound lexical structures increase children's compound lexical awareness and vocabulary depth? b) Does the vocabulary knowledge of taught words from targeted training in compound lexical structures transfer towards novel words? c) Is there a relationship between initial skills in vocabulary depth and morphological compound awareness and their improvement post-intervention? 2. What are teachers' perspectives and experiences of the Lexical Compounding Awareness? A paired samples *t*-test showed that there was an improvement between pre and post-test assessment performance. ANOVA showed a strong transfer effect from morphological awareness and vocabulary knowledge of taught words to other novel words. Significant strong correlations also showed that initially low-performing students showed the greater improvement after intervention. The teachers who delivered the intervention also expressed an overall positive experience of the intervention. Implications for future research and practice in literacy interventions and morphological training for vocabulary growth are discussed.

CHAPTER 1 Introduction

Vocabulary provides a foundation to literacy development and can predict later literacy skills such as reading comprehension (Aarnoutse et al., 2001; Anglin et al., 1993; Nagy, 1988). Improvement in vocabulary knowledge also produces a synergistic effect to literacy and language learning: greater vocabulary enables more literacy exposure, which further improves vocabulary knowledge and acquisition (Hemphill & Tivnan, 2008; Marulis & Neuman, 2010). Additionally, studies point to disadvantages in terms of vocabulary knowledge and language acquisition in high-poverty, which produces trickle-down effects to other literacy skills (Neuman et al., 2018; Wang et al., 2018; Wang & Li, 2008). Thus, it is imperative for researchers to understand effective vocabulary interventions to support literacy development in the foundational years of formal literacy learning.

The development of vocabulary knowledge is known to be associated with certain metalinguistic understandings and skills in literacy such as phonological and morphological knowledge (Aarnoutse et al., 2001; Anglin et al., 1993). Explicit instruction of vocabulary knowledge through direct teaching in morphological awareness and phonological awareness have been shown to be effective in alphabetic languages (Anglin et al., 1993; Berninger et al., 2010; Nunes et al., 2010; Nunes & Bryant, 2006a). As such, a targeted training in metalinguistic awareness of literacy skills may contribute to vocabulary development. In the Chinese context, scholars have found associations between vocabulary knowledge and morphological awareness. The nature of Chinese orthography is such that morphology plays an essential role in Chinese literacy acquisition. Consequently, the current study looks at the effects of a morphological awareness training on vocabulary knowledge for young Chinese literacy learners.

This study evaluates a vocabulary intervention that focuses on training lexical compound awareness in primary school children in rural China. Generalisations for intervention efficacy can be achieved through randomised control trials that measure students' progress in education interventions comparing control and treatment groups (Cohen, 2002). Pilot trials, however, contributes much value in exploring the feasibility of potential large scale intervention trials and provides process information to ensure fidelity and effective resource input in future implementations(Dawson et al., 2018; Pearson et al., 2020). The current study is a pilot trial that focuses on assessing the feasibility of lexical compound awareness training as an approach to improving vocabulary knowledge rather than a generalisable efficacy of the intervention. Though smaller and underpowered in

scale, this study design falls within the preparation phase of a future randomised control trial and may provide much value in informing the preparation for a larger scaled efficacy trial. The study is also aimed towards a community with low-income and low academic achievement in rural China and hopes to provide information of the feasibility of vocabulary interventions in diverse settings. The research hopes to build upon previous literature that show an association between vocabulary knowledge and morphological awareness and aims to assess children's response to morphological training for vocabulary knowledge improvement. The dissertation also extends findings from previous lower primary school and preschool intervention studies to understand how Chinese vocabulary interventions may influence third-graders in rural China.

1.2 Structure of the Dissertation

First, the dissertation will provide an overview of Chinese orthography and review the literature and theories in morphological awareness and vocabulary knowledge. Second, the methodology is presented, including a description of the mixed methods design, recruitment process, participants, assessments, materials, intervention design and analysis methods. Third, the dissertation will present the results section, detailing descriptive data on children's performance on an assessment battery along with statistical analyses to explore metalinguistic training approaches used in the intervention and qualitative analysis addressing teachers' experiences in the intervention. The final chapter will discuss interpretations of the findings, the limitations of the current study and provide implications of the study's conclusions towards the field of literacy education, intervention studies and applications in practice.

CHAPTER 2 Literature Review

The Chapter will first provide an overview of Chinese orthography and morphology, which will set the foundations for a discussion on morphological development, literacy growth and its association with vocabulary development. The chapter will then evaluate current interventions targeting morphological awareness (MA) and effective modes of instruction and teacher training. The chapter will conclude by connecting the reviewed literature with the current study

2.1 Chinese Orthography and Morphology

2.1.1 Sub-lexical Orthography and Morphology

Chinese orthography, or the way spoken language is visually presented, has been categorised as morphosyllabic (Hung, 2011). This classification means that the basic writing unit in Chinese, characters, are often comprised of sub-lexical morphemes that communicate phonetic or semantic information (Hung, 2011). These sub-lexical morphemes are termed radicals (Cheung et al., 2013; DeFrancis, 1989; Wang, 1973).

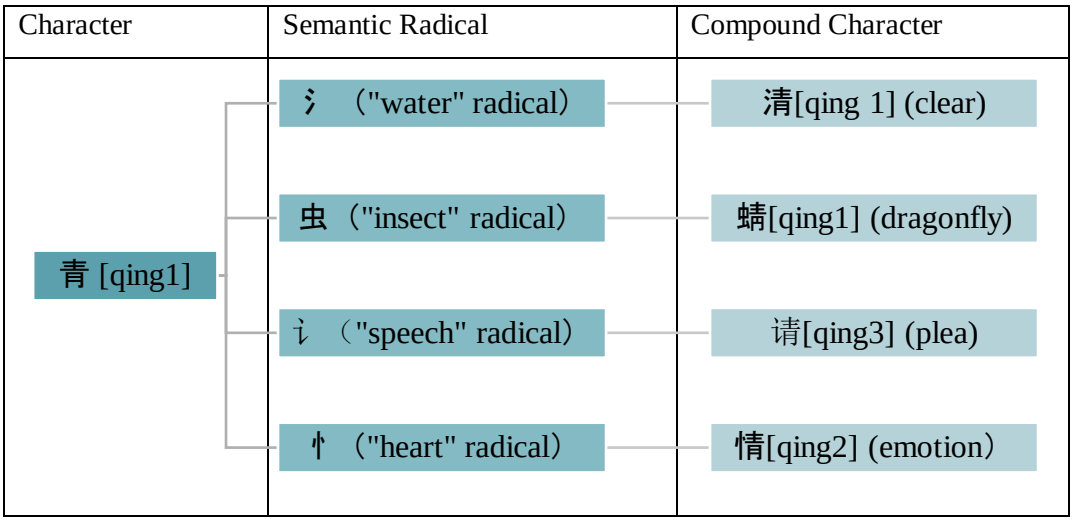
Chinese orthography differs from the alphabetic writing system in that the smallest writing unit in the alphabetic system, the alphabet, is mapped onto phonemes (Cheung et al., 2013). For example, in English, alphabets can be grouped to form the sound of a word, such as the word “cat” is formed by combining alphabets “c-a-t”, of which each alphabet represents a phoneme. However, Chinese characters are mainly meaning symbols that convey semantic information, occasionally embedding phonological cues (Cheung et al., 2013). For example, the character 青 [qing1] is mapped onto the meaning of “turquoise” (in Chinese, phonetics include both the pronunciation, represented here through alphabets [qing], and one of four possible tone represented here as the number [1]). For compound or complex characters, they may be further analysed into a combination of smaller radicals that signify semantic and/or phonetic information (Kang, 1993). This process of combination to form new compound characters make up the nature of Chinese character formation.

Chinese orthography presents sub-lexical morphology in the form of compound characters. For example, when adding a semantic “insect” radical 虫 to a character 青[qing 1], this produces a compound character 蜻[qing1] (dragonfly). In this example, sub-lexical morphology produced a change in the character’s meaning while the tone and pronunciation stayed constant. Additionally, by replacing the “bug” radical 虫 with a

"heart" radical 忄 forms the character "情" [qing2] (emotion) (Figure 1). A change in the semantic radical led to a shift in both meaning and tone. Because of the nature of Chinese's writing system, morphology and orthography in Chinese are closely intertwined, meaning that the written form of a character and the meaning of the character is highly

Figure 1

Example of Sub-Lexical Morphology in Chinese



Note: The figure provides an example of sub-lexical morphology using the character 青[qing1]; when this character is combined with other semantic radicals, new characters are formed called compound characters, each producing drastic shifts in meaning. The first two examples show that attaching either a "water" radical or an "insect" radical to the character produces a semantic change while the phonetics stay constant. The bottom two examples show how by adding the "speech" radical or the "heart" radical, there is both a semantic change and a tonal change to the character.

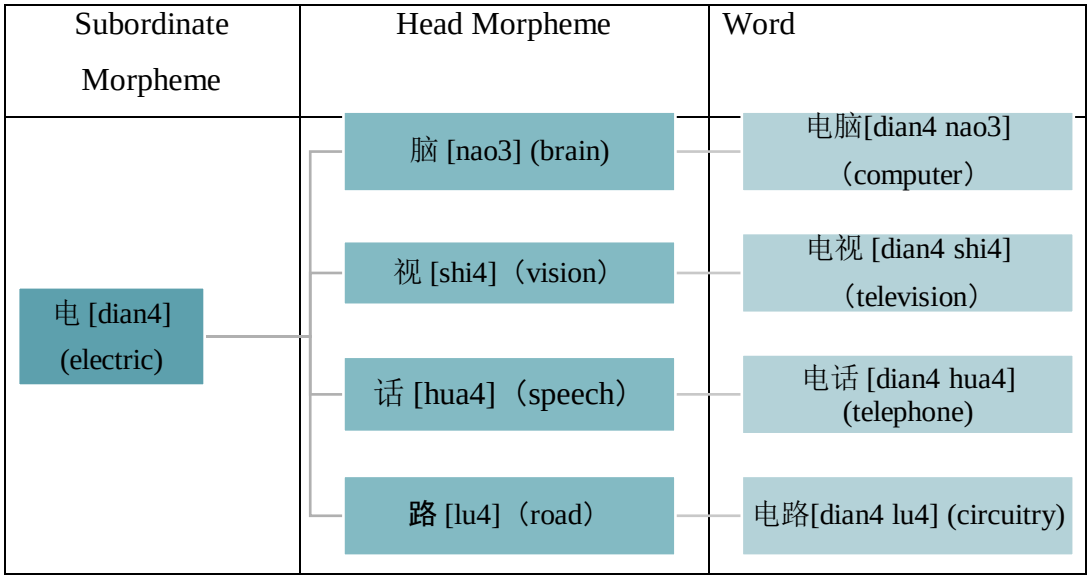
2.1.2 Lexical Orthography and Morphology

Chinese orthography is also highly dependent on lexical, or word-level, morphology. In many Latin-based languages, word-level morphology primarily focuses on inflectional and derivational morphology(Kuo & Anderson, 2006). For example, to represent "walk" as a past tense in the English language, one would add a suffix "-ed," which would become "walked". To represent that one will "read" something again, one would add a prefix "re-" to become "reread." However, Chinese morphology rarely presents through inflectional and derivational morphology. Instead, the focus of lexical morphology in Chinese is compound words, where approximately 80% of all Chinese words are compound words (Institute of Language Teaching and Research [of China], 1986). In Chinese, two to four characters are combined to create a compound word. For example, the word "television" in Chinese is "电视" [dian4 shi4], which is comprised of

two characters “电” [dian4] (electric) and “视”[shi4] (visual), forming the compound word 电视[dian4 nao3], or literally, “electric-visual” (Figure 2). Learning the meaning and how

Figure 2

Example of Lexical Level Morphology in Chinese



Note: The figure provides an example of lexical morphology using the subordinate morpheme 电 [dian4] (electric). When the subordinate morpheme is attached to a head morpheme, this produces a compound lexical where the subordinate morpheme modifies the meaning of the head morpheme.

to combine morphemes to produce words is essential in learning Chinese because of how often the same morphemes, or characters, are reused in other compound words.

Because of the morpheme focused orthography of Chinese and the primary role that lexical-compounding plays in the Chinese language system, lexical-level compounding awareness becomes essential to proficiency in Chinese.

2.1.3 Types of Lexical Compounding Structures

Modern Chinese linguistic scholarship has commonly grouped compound words into five main structures: coordinative compound structures (联合型), subordinate compound structures (偏正型), supplement compound structure (补充型)， verb-object compound structure (主谓型)，and subject-predicate compound structure (动宾型) (Bo & Liao, 2017). Among these categories, the subordinate compound takes up more than 50% of all types of compound structures in the Chinese language (Chen & Duan, 2016). A bimorphemic subordinate compound structure refers to a word with two morphemes where the first morpheme qualifies, or is a sub-category, of the later character. For example, for the word “天蓝”[tian1 lan2] (sky-blue) , this word primarily is defined by the second

morpheme “蓝”[lan2] (blue), referring to the colour blue, and the first morpheme qualifies the specific shade of blue “天”[tian1] (sky).

2.2 Morphological Awareness and Development

Building on knowledge of Chinese orthography and morphology in bimorphemic subordinate compound structures, this section will explore the development of MA during early childhood and primary school.

2.2.1 What is Morphological Awareness

Generally, MA refers to a child’s ability to identify, reflect on, and manipulate words’ morphemic structures (Carlisle & Feldman, 1995a; Kuo & Anderson, 2006). MA contributes to children’s literacy skills because children begin attend to and utilise how morphemes may combine to form meaningful new words (Carlisle, 2000; Levin et al., 2001; Nagy, 1988; Taft, 2003; Taft & Zhu, 1995). MA may present on a lexical and sub-lexical level as demonstrated previously, or it may be characterised by derivational, inflectional or compound morphology (Carlisle, 2010). While children are developing on equivalent trajectories, the characteristics of different language structures may influence how MA influences literacy development the importance of different dimensions of MA towards literacy development (Mcbride-Chang et al., 2008; Saiegh-Haddad & Geva, 2008). For example, English morphology greatly emphasises derivational knowledge. Therefore, derivational MA contributes much to English literacy development during the early years of literacy learning (Green, 2015). Since compound lexical structures are dominant in Chinese morphology, it is hypothesised that compound lexical awareness also becomes a foundational and central literacy skill in learning Chinese (Liu & McBride-Chang, 2010).

2.2.2 The Development of Morphological Awareness

Development in a range of MA capabilities have been observed from both an early age throughout primary school and within diverse linguistic contexts. Studies have shown emerging MA as young as preschool and early primary years (e.g. English: Berko, 1958; French: Nicoladis, 2002; Cantonese, Mandarin and Korean: McBride Chang et al., 2008; Dutch: Rispens et al., 2008). Berko (1958)observed that English-speaking children aged five and a half to seven years old were able to apply simple inflectional rules to nonsense words (e.g. the plural form of “wug” is “wugs”). French and English bilingual children aged three and four were able to produce and indicated their understanding of novel

compound nouns (Nicoladis, 2002). Aged 4-5 Cantonese, Mandarin, and Korean pre-schoolers demonstrated lexical compounding skills by creating novel compound words (McBride-Chang et al., 2008). These emerging morphological skills continue to develop throughout primary school and children begin growing in their capability to decode words with complex structures. A longitudinal study of English-speaking children from grade one to grade six found that for certain morphological skills, growth was most steep during the first three grades, and such skills saw continuous growth after third grade (Berninger et al., 2010). Specifically, derivative awareness showed steady growth throughout primary school (Berninger et al., 2010). Therefore, while MA develops early on in schooling, the trajectory of its development continues for much longer in comparison to other linguistic awareness (Nagy, 1989; Nagy et al., 2003). Research on primary school students demonstrates that MA is a multidimensional concept in which different aspects of MA develop at a different pace.

MA and its development may differ across different language systems depending on the characteristics of the language structures (Mcbride-Chang et al., 2008; Saiegh-Haddad & Geva, 2008). For example, English speaking children are able to develop core skills in inflectional knowledge in early primary school, while derivational morphology develops throughout primary school and towards middle school years(Berko, 1958; Carlisle & Feldman, 1995b; Derwing & Baker, 1977). The complex nature of English derivation compared to inflection may be the cause of this developmental difference. This difference is also reflected in the development of Chinese MA. For Chinese students, their acquisition of compounding morphology greatly surpassed their knowledge of derivational rules, reflecting the primary foundation of word building in Chinese (Ku & Anderson, 2003). This difference in morphological development paces reflects the nature of Chinese word construction that is based on lexical and sub-lexical compounding rather than derivation and inflection. MA studies across different contexts provide evidence that language structure may influence the development of the dimensions of MA.

2.2.3 The Development and Assessment of Chinese Compound Lexical Awareness

Research has observed how compound lexical awareness in Chinese emerges in early kindergarten and continues to develop as children grow in cognitive capabilities and are exposed to more literacy experiences (Ku & Anderson, 2003; Tong & McBride-Chang, 2010). Assessing children's developing compound lexical awareness that accurately measures the construct while being developmentally appropriate poses a challenge in the

field. There is currently a lack of standardised MA assessments in Chinese. Because of children's growing capacity in their compound lexical awareness, linguistic manipulations presented in assessments in young children may not be suitable for older children and vice versa (Liu & McBride-Chang, 2010). Different forms of question format may also introduce issues of validity to MA assessment. This study will now present key studies inspecting compound lexical awareness in Chinese primary school children and assessments used in the studies.

Chen and colleagues (2008) identify this emergence of compound lexical awareness in early primary school. The researchers looked at lexical compound awareness in first and second graders in Mainland China. The researchers inspected this skill through two tests: the compound structure task and the compound analogy task. The compound structure task, adapted from Nagy and colleagues (2003), asked children to choose a name to describe a made-up animal or object. For example, a child would be asked "which is a better name for a fish that wears a dress? A fish dress or a dress fish?". The child would be asked a second question with the same two options for a response, "which is a better name for the dress that a fish wears? A fish dress or a dress fish?" (Chen et al., 2008, p621). While a multiple-choice format assessment may be suitable for younger children in detecting their emerging MA, such a format may also be susceptible to false-positive responses due to children's guessing. The second test was adapted from McBride-Chang and colleague's studies (2003, 2005, 2008, 2010). A detailed description of this task will be given in the following paragraph. This study focused on children's awareness of compound nouns rather than other categories of compound words. Results show not only that lexical compound awareness is seen in early primary school but that there is improvement in this capability during the early years.

Tong & McBride-Chang (2010) conducted a cross-sectional study that looked at a wide range of literacy capabilities, including compound lexical awareness among Hongkong children in kindergarten, second grade, and fifth grade. Compound lexical awareness was inspected through a morphological construction task. In this test, children were asked to construct new compound words by combining familiar morphemes based on examples given by the assessor. For example, the examiner may ask "There is one type of oil made using peanuts; we call it peanut-oil. What would we call a type of oil made using mushrooms?" The appropriate response for this question would be mushroom-oil (Tong & McBride-Chang, 2010, p1665-1666). The researchers found that children's compound lexical awareness improved across grade levels. Second-graders' performance on the test

was substantially higher in comparison to that of kindergarteners, and fifth-graders scored significantly better than second-graders. This observation suggests that compound lexical awareness does not reach ceiling during primary school years and continues to grow from early years to late primary school. It is noteworthy, however, that the tasks use during this assessment may be susceptible to threats to construct validity since children may be answering the assessment based on analogues answer and responding to patterns found in the assessment prompts rather than comprehending the lexical structures needed to provide an accurate response.

While previous studies either focused on compound nouns or did not specify the type of compound lexical structure tested, Liu and McBride-Chang (2010) delves into how different lexical compound structures may influence how difficult children may find to comprehend or produce. The researchers looked at the lexical compounding awareness of third graders in Beijing China. In addition to the compound construction task used in previous studies (McBride-Chang et al., 2005), the researchers developed a compound production task to address children giving responses based on guessing and analogy. In this newly developed task, the researchers would ask the child to construct a made-up compound based on a definition given without providing any prompting or examples. For example, the test administrator may ask "what should we call a monster that eats iron?" The correct response would be "iron-eating monster" (Liu & Mcbride-Chang, 2010, p66). Though this test may address issues of guessing answers from multiple-choice tests (E.g Chen et al., 2008), and analogy based answers which appeared in the original morphological construction task (e.g McBride-Chang et al., 2005), children may still answer the test based on pattern recognition of question and item responses rather than responding based on their knowledge of lexical compounding. However, this test was able to demonstrate with relative reliability that children found subordinate and coordinative structures substantially easier to compound than subject-predicate and verb-object structures. The study also observed that children found novel compounds that included verbs were more difficult to manipulate.

2.3 Literacy and Morphological Awareness

After an overview of morphological development, specifically in the Chinese setting, this section will now explore how MA contributes to literacy skills such as vocabulary knowledge.

2.3.1 Morphological Awareness and Vocabulary Knowledge

MA is highly correlated with vocabulary knowledge and growth because this awareness allows children to infer the meaning of morphologically complex words (Nagy & Anderson, 1984). Children may also learn new vocabulary by dissecting and manipulating morphemes children encountered before (Nagy & Anderson, 1984). Vocabulary knowledge as a construct includes both depth and breadth of word knowledge. While vocabulary depth refers to the extent of semantic comprehension of a word, vocabulary breadth constitutes one's vocabulary size (McBride-Chang et al., 2005).

The relationship between MA and vocabulary knowledge is seen cross-linguistically. Carlisle (2000) found that the awareness of word structure in English-speaking third and fifth graders was significantly related to how well children can define morphologically complex words. The study inspected children's awareness of the structure and meanings of words that were derived from a root word, and how this awareness was able to support their ability to read and comprehend words. Results showed that awareness of derivational structure was associated with vocabulary depth (Carlisle, 2000).

The association between vocabulary knowledge and MA extends to other dimensions of MA, such as compound lexical awareness. Ku and Anderson (2003) demonstrate that lexical compound awareness is associated with vocabulary knowledge for primary school students in Taiwan and the United States. Ku and Anderson (2003) used three MA tests that examined children's ability to discriminate and recognize words with the same morpheme and identify morphological relationships within words. The study confirmed a strong relationship between MA and vocabulary knowledge, specifically vocabulary depth (Ku & Anderson, 2003).

Similarly, in a cross-linguistic and cross-cultural comparative study conducted by McBride-Chang et al. (2005), the researchers found a correlation between MA and vocabulary knowledge. However, the strength of association may differ depending on the language structure (McBride-Chang et al., 2005). The study inspected morphological structure awareness and its relationship with vocabulary knowledge for second graders in Beijing, Hong Kong, Korea, and the United States. (McBride-Chang et al., 2005) Specifically, the study looked at MA at a lexical compound level for all four countries and included an inflectional task for children in the United States (McBride-Chang et al., 2005). The assessments were designed to be comparable cross-linguistically among the same age group. The study confirmed previous work by showing a strong relationship between MA and vocabulary knowledge. The study also found that MA may be more important for

literacy skills in Chinese and Korean than for English because of how Chinese and Korean language structures emphasize morphology and specifically lexical compounding (McBride-Chang et al., 2005).

2.3.2 Chinese Literacy Acquisition and Morphological Awareness

Studies demonstrate the significant role that MA plays in fundamental literacy skills in Chinese, such as word reading and vocabulary knowledge. Chen et al. (2009) found in first and second graders in China, children's vocabulary development was greatly mediated by their lexical compound awareness. The researchers found that young children's ability to identify the head morpheme within a subordinate compound noun (the head morpheme referring to the morpheme that defines the primary category of the noun, e.g "ball" for "football", "cake" for "pancake"), and their ability use familiar morphemes to create new compound words greatly contributed to their development of vocabulary knowledge overtime Chen et al. (2009). The effect of MA greatly exceeded that of phonological awareness towards vocabulary development (Chen et al., 2009).

Chinese MA may contribute to literacy learning from a lexical and sub-lexical level (Tong,et al., 2017b). Sub-lexical MA refers to the ability to detect and utilize semantic radicals, in other words - small units of meaning that combine to form a character, within a compound character to infer meaning and make connections with other words with the same semantic radicals (Tong, et al., 2017b). Lexical MA is defined as one's ability to identify and manipulate single morphemes within a compound word (Tong, et al., 2017b). Tong and colleagues (2017b) observed that vocabulary knowledge played a mediating role between MA and word reading. Results showed a strong correlation between lexical-level MA and vocabulary knowledge. The researchers also found that lexical level morphology is a crucial factor influencing how MA may contribute to word reading.

The researchers hypothesise the reason behind the correlation between vocabulary knowledge and lexical-level MA is because of how lexical compounding awareness contributes to vocabulary breadth (Chen et al., 2008) and depth (Ku & Anderson, 2003). The nature of Chinese orthography dictates that a single morpheme often appears in multiple words describing similar concepts or contexts (Tong, et al., 2017b). For example, the character 叹(sigh/gasp/exclaim) is reused in a large number of bimorphemic compound words such as 哀叹(to bewail)，赞叹(to exalt)，惊叹(gasp in surprise)，长叹(a long sigh) , etc. By knowing the character "叹 (sigh/gasp/exclaim)"，one may be able to infer the meaning of a novel compound word that includes the character " 叹

(sigh/gasp/exclaim)". One might also be able to produce new words by combining known characters according to lexical compounding structural rules (Tong, et al., 2017b). In terms of vocabulary depth, lexical level MA supports one's comprehension of a word through dissecting and identifying morphemes within a compound word (Ku & Anderson, 2003). For example, when encountering a new word such as 哀叹(to bewail), one might interpret the word by decomposing the word into two separate characters "哀（sorrow）" and "叹(sigh/gasp/exclaim)" and infer that the word means "exclaiming sorrowfully" or "bewail". Because of this connection, lexical level MA may significantly contribute to vocabulary knowledge and development.

When comparing another dimension of Chinese MA, homophone awareness, with lexical compounding, Liu et al. (2013) found the significant mediating effect that lexical compounding awareness had on vocabulary development. The study found that both MA constructs were bi-directionally associated with word reading and vocabulary knowledge. However, while homophone awareness was associated with vocabulary but not word reading, lexical compounding was correlated with both. This study that was based on a fairly normally distributed sample of third grade Chinese speaking and typically developing children, showed that there was a somewhat strong association between compound lexical awareness and Chinese word reading and vocabulary knowledge. This study established an association between MA, specifically on the lexical compounding level, and children's language and literacy development in Chinese.

The researchers explained that this strong correlation between MA and vocabulary knowledge may be caused by the extra cues given through the compound lexical structure itself (Liu et al., 2013). Lexical compound structures can provide children with additional information through contextual and grammatical information that is embedded within the lexical structure. For example, the compound word 天蓝 [tian1 lan2]（sky blue）, and 蓝天[lan 2 tian1] (blue sky) mean different things, though they are comprised of the same two morphemes. Both are subordinate lexical structures, meaning that there is a modifier morpheme and a head morpheme. The modifier and head morpheme is dependent on the position of the two morphemes: the first morpheme modifies the second head morpheme. In the example, 天蓝 [tian1 lan2]（sky blue）, "sky" modifies "blue", referring to the colour blue that is the shade of the sky, and as for 蓝天 [lan 2 tian1] (blue sky) , it instead refers to a sky that is blue. This study shows that lexical compound awareness may be especially important to the learning and development of Chinese literacy.

In summary, MA, specifically lexical compounding awareness, the two skills are not only correlated, MA is also a significant predictor of vocabulary growth. Research also suggests that specific training in MA may be useful in facilitating children's vocabulary growth. The next section will review the literature on vocabulary and MA interventions and their effectiveness.

2.4 Interventions in Morphological Awareness

This section aims to understand the characteristics of effective MA intervention and training. The section builds upon discussions of correlational studies focusing on vocabulary and MA in the previous section and provides a selective review of interventions in MA through analysing two meta-analyses on MA interventions, interventions in the Chinese context, and teacher training in interventions.

2.4.1 Effectiveness of instructions in Morphological Awareness

Current meta-analyses of morphological interventions across diverse linguistic contexts have observed a moderate effect on literacy outcomes (e.g Bowers et al., 2010; Carlisle, 2010). Most meta-analysis on morphological instruction and intervention has primarily focused on English and other alphabetical language contexts. This study reviews two meta-analyses: one conducted by Bowers and colleagues (2010) that looked at studies in four alphabetical linguistic contexts, and another by Carlisle and colleagues (2010) that reviewed journals across six linguistic contexts, including studies in the Chinese context.

Bowers and colleagues (2010) reviewed 22 studies across English, Danish, Dutch and Norwegian for children from preschool to grade eight, and found that morphological interventions support literacy learning in reading, spelling, vocabulary, and morphological skills. Researchers found that morphological instruction was most effective at the sub-lexical level, and while lexical-level instruction also improvement in literacy learning, the effects did not stand out among other well-known methods of instruction. Researchers also found that targeted morphological training benefited less skilled literacy learners and young literacy learners, and such training benefited struggling learners more when integrated with other methods of literacy instruction. This finding was contrary to previous research stating morphological training for young or struggling children in literacy may be unhelpful (Adams, 1990). While this paper emphasised the role of sub-lexical awareness in targeted training over lexical awareness training, one must take caution in generalising such findings to other non-alphabetical linguistic contexts. As previously stated, linguistic systems may

impact the role that lexical-level MA may influence literacy learning. Lexical-level morphological training may play an equal, if not more, critical role in literacy learning in logographic languages such as Chinese or other compound-lexical-heavy languages such as German and Korean.

Carlisle (2010) conducted an integrative review that inspected 16 studies ranging from kindergarten to fifth grade across English, Chinese, Dutch, Danish, French, and Norwegian contexts. Overall, the meta-analysis found that morphological training can support children's development in phonology, orthography, and word comprehension. This finding was most evident when the training focused on morphological structure, spelling, and morpheme comprehension. Carlisle (2010) observed that the English studies demonstrated greater literacy learning outcomes for older students. However, this age group difference did not present in the Chinese studies. The Chinese studies showed that morphological training benefited children as early as kindergarten in their character recognition and vocabulary knowledge. The review also found an effect of morphological training on children's ability to infer meanings of novel words. However, this benefit has not yet been seen to extend towards improving children's reading comprehension (Baumann et al., 2002, 2003; Tomesen & Aarnoutse, 1998). However, such cross-linguistic comparisons may be limited because of the different strategies of measurements used in the interventions reviewed in this meta-analysis.

Based on the review, Carlisle (2010) provided a guideline towards effective morphological instructional approaches. Firstly, Carlisle (2010) found that instruction and activities were most useful in increasing children's morphological structural awareness when combined with other approaches. This approach included decomposing compound words into smaller morphemes or finding common morphemes in words. While the author saw this to be an effective way in acquiring foundational MA, such activities were not able to translate to long-term capabilities that may be used in reading and writing. A second approach was to teach the meaning of affixes and root words. A third approach was to encourage children's "morphological problem solving" (Anglin et al., 1993, p5.), referring to activities that fostered children's analytical skills towards morphological problems (e.g identifying and correcting errors, creating novel words based on familiar morphemes, analysing the meaning of familiar morphemes when used in different contexts, etc.). A fourth approach is to provide children with strategies to decipher the meaning of novel words through morphological analysis. Additionally, Carlisle (2010) pointed out that the

developmental appropriateness of target word types and words chosen for morphological instruction also contributed to program effectiveness.

2.4.2 Interventions for Chinese Morphological Awareness

Literacy intervention studies provide useful insight into causal relationships between different literacy skills and implications for bridging research with application to provide targeted literacy support (Cohen et al., 2002; Goodwin & Ahn, 2013; Kim et al., 2020). As shown above, there is a growing body of intervention studies targeting MA during early years and primary school. There have been few studies that have looked into Chinese MA training for primary school-aged children in monolingual settings. Two studies in mainland China are presented below.

Packard and collages (2006) investigated the effect of explicit morphemic and orthographic instruction on first grade Children's Chinese literacy skills. Participating children were from a monolingual Chinese environment of two primary schools in Beijing, China. Before the explicit instruction in morphological and orthographical awareness, children were assessed for their general IQ and literacy abilities, such as character writing, morphological and phonological awareness. MA was assessed mostly in terms of the children's homophone awareness. For example, in one task, children were read out a list of words that contained homophones, referring to words that sound the same but are spelled differently (such as "pain" and "pane"). For instance, children were asked to find the odd character out from the list 健康[jian4 kang1], 健壮[jian4 zhuang4], 健美[jian4 mei3], 建设[jian4 she4]. A correct response would be 建设[jian4 she4], since the first three words shared the same morpheme 健 [jian4], while the last word contained a homophone 建 [jian4] (Packard et al., 2006).

The children were divided into a control and treatment group, where the control group continued business as usual and the treatment group was instructed in a course that aimed to improve their orthographic and morphological structure knowledge (Packard et al., 2006). The daily lessons for the treatment group involved curriculum designs that directed children's attention towards individual morphemes within bimorphemic words (Packard et al., 2006). For example, within the daily lessons, children were asked about the meaning of individual morphemes and words and the connection between the two, etc. After two semesters, the children were tested again in their literacy abilities.

Researchers found a significant improvement in both children's MA and their literacy skills (Packard et al., 2006). Specifically, children improved in all measures of MA,

particularly when compared to their phonological awareness. The intervention also saw an improvement in children's ability to write Chinese characters and their reading skills. The researchers concluded that the effectiveness of the intervention may demonstrate how explicit MA training in primary school years for Chinese may be useful in supporting literacy development in Chinese.

Wu and colleagues (2009) conducted a longitudinal intervention study that examined the relationship between literacy growth and MA of Chinese children in early primary school. For the children participating, half of the children received targeted instruction on MA in their first and second year and the remaining students continued the normal school curriculum. Children were tested in their first second and third year on their MA and literacy development. Children's MA was tested in terms of lexical and sub-lexical level awareness and homophone awareness. In terms of literacy skills, children were tested in terms of their reading, vocabulary knowledge, and writing skills. Morphological instruction of the intervention was integrated into the children's normal classroom routine. While in year one, the instructional focus was sub-lexical awareness, in the second grade, the instruction shifted towards lexical level MA.

Through structural equation modelling, the researchers found a unidirectional causal relationship between MA and literacy development for early second grade students. In early third grade, this relationship became reciprocal (Wu et al., 2009). Overall, the researchers found that a targeted morphological and awareness instruction embedded within the class curriculum saw improvement in children's general MA, and general literacy development. Specifically, the study found significant effects in early second grade vocabulary knowledge and sentence reading comprehension. The study also found improvement in word dictation, reading fluency, and paragraph reading comprehension at the beginning of the third grade.

2.4.3 Effective training for teacher-led interventions

The quality of intervention delivery for classroom-based and teacher-led interventions can affect implementation and fidelity (Kim et al., 2020). Thus, teacher training is paramount to intervention effectiveness. This section provides an overview of the key characteristics of teacher training in effective literacy interventions and approaches to successful professional development.

Kim and colleagues (2020) conducted a meta-analysis of literacy interventions in low and middle-income countries that highlighted key elements for effective teacher

training for literacy interventions. The results indicate that teachers in low educational resource settings often lack foundational knowledge on literacy development and specific literacy instruction (i.e reading instruction, vocabulary instruction etc.). Thus teacher training before interventions is particularly essential (Kim et al., 2016, 2020). The review found that the common characteristics of successful interventions include professional development with workshops that was accompanied by booster sessions and ongoing teacher support.

The content and framework of teacher training design also contribute to effectiveness and applicability. Cordingley and colleges (2015) reviewed literature on teacher professional development and learning and provided a framework on effective professional development that listed four key characteristics: 1) creating a "rhythm of follow-up, consolidation, and support activities" (p.13) ; 2) designing for teacher needs; 3) fostering shared purpose; and 4) aligning the various components of the training. While teacher training in the current study focuses on teachers instructing on a specific set of skills within a limited timeframe, the teacher training is designed in alignment with Cordingley and colleges' (2015) guiding framework for professional development.

Such meta-analyses confirm previous literature on teacher training is essential to the effectiveness of literacy interventions and instruction. While teacher feedback can be a useful tool in understanding implementation and fidelity and teacher experiences, it is often not reported in literacy intervention literature.

2.5 The Current Study:
A Vocabulary Intervention Through Morphological Awareness Training

This study developed a vocabulary intervention focused on training third grade primary school students' lexical compounding awareness to explore if targeted lexical compounding awareness training can improve vocabulary depth.

The focus on compound lexical awareness stems from how compound words make up the majority of vocabulary in the Chinese language (ILTR, 1986). Past literature provides evidence for a causal relationship between MA and vocabulary depth development (Chen et al., 2008; Ku & Anderson, 2003; McBride-Chang et al., 2010; Tong et al., 2017). Research also states that vocabulary knowledge mediates much of how MA contributes to other literacy skills such as reading comprehension (Chen et al., 2008; Tong & McBride-Chang, 2010). Because of this association and the importance of vocabulary knowledge to

children's early literacy growth, this study primarily inspects the relationship between lexical compounding awareness and vocabulary depth.

Previous literature supports that children during mid to late primary school demonstrate good command of bimorphemic subordinate compound structures yet find compound lexical structures containing verbs and adjectives challenging. This study focuses on training the three different subordinate compound lexical structures to hopefully utilize children's emerging knowledge of subordinate structures and scaffold learning in compound lexical structures containing verbs and adjectives. The learning of subordinate structures allows a wider range in difficulty level, from simpler noun based subordinate structure seen in early primary school studies (eg. Chen et al., 2008), to more challenging verb-based subordinate structures referenced in late primary school studies (e.g Liu & McBride-Chang, 2008).

A review of the relevant research illuminates current theoretical gaps in the literature. There is a lack of intervention studies for Chinese MA addressing literacy development in late elementary school and no studies to the researcher's knowledge that looks at short-term MA interventions. Previous interventions in the Chinese context focuses on MA in preschool-aged and early primary-school-aged children and have found that targeted MA training has been effective in improving other literacy skills. Recent scholarship has shown an association of MA with literacy skills in older children. This association may imply that targeted MA training may positively affect literacy development for children in mid to late primary school. The current study inspects the feasibility of a short-term teacher-led intervention specifically targeting compound lexical awareness in late primary school on vocabulary knowledge.

Gaps in the literature for intervention uptake in low-resource communities are also addressed in this study. Previous literature on MA interventions focused on educational resource-rich areas. This context may contribute to the success of interventions (i.e teacher instructional skills, students' foundational literacy knowledge, etc.). At the same time, intervention in such contexts may not be viable in other low-resource contexts which make up the majority of literacy learning environments. This study focuses on a low income and low resource rural region in China where academic achievement is below the national average (Li, 2019). This study contributes to the generalizability of vocabulary intervention research in Chinese in diverse settings and the experiences of the participants.

This study also adds to the body of methodological literature by providing a naturalistic approach through a mixed-methods design. Intervention research in low

resource settings is also often susceptible to threats to implementation fidelity because the demands of the intervention may be too high for the schools or communities to meet (Nag et al., 2019). Participants may provide valuable contributions to applicable and context-sensitive design and interpretation of intervention effectiveness (Cohen et al., 2002). Further rationale for methodology is provided in the following chapter.

Following a review of the literature, the study addresses two main research questions, with the first research question divided into three subcomponents:

1. **Does an intervention that focuses on systematically instructing on Chinese compound lexical structures affect third graders' Chinese vocabulary knowledge?**
    a) Does targeted training in Chinese compound lexical structures increase children's compound lexical awareness and vocabulary depth?
    b) Does the vocabulary knowledge of taught words from targeted training in compound lexical structures transfer towards novel words?
    c) Is there is a relationship between initial skills in vocabulary depth and morphological compound awareness and their improvement post-intervention?
2**. What are the teachers' perspectives and experiences of the Lexical Compounding Awareness?**

In summary, firstly, the current study aims to explore and evaluate a vocabulary intervention focusing on lexical compound awareness training. The researcher hypothesizes that a targeted training of Chinese lexical compound awareness for third grade children in rural China will improve their vocabulary depth. Secondly, the study aims to understand the perspectives of the participating teachers of the intervention.

CHAPTER 3 Methods

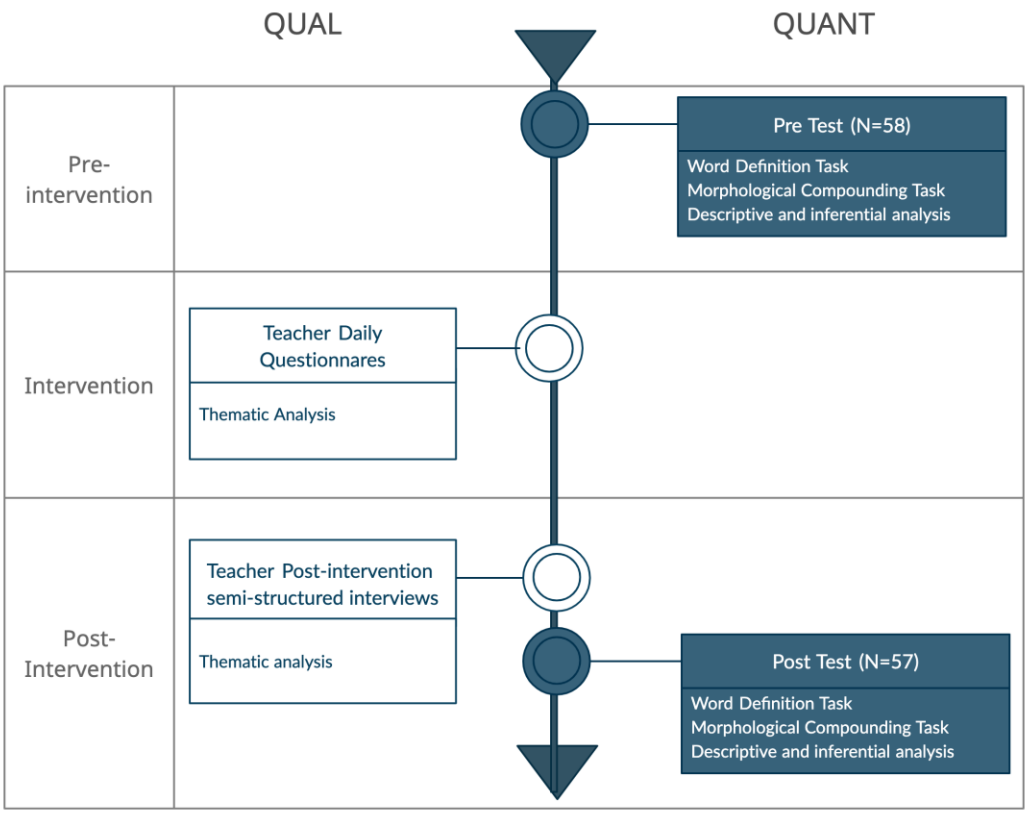
3.1 Research Design

The study employed an embedded quasi-experimental design (Creswell & Clark, 2017) where mainly, a quantitative approach was utilised to evaluate children's responses to the intervention with qualitative data to supplement the analysis, and qualitative approaches were used to understand the teacher's view on the intervention. A socio-constructivist perspective of children's literacy development and culturally sensitive research guided the choice of a mixed-methods design and the intervention design. In a socio-constructivist theory, Literacy learning is connected to the environment in which it happens where learners and teachers are both active participants and co-creators in the learning process(Adams, 2006; Unrau et al., 2018; Vygotsky, 1978). When understanding a phenomenon, socio constructivist theory considers multiple perspectives, including both the researcher and the participants, through qualitative means (Angen, 2000; Creswell & Clark, 2017). The efficacy of intervention studies and data analysis in under-researched and multilingual settings can be highly dependent on contextual factors (Nag et al., 2019). Past research in morphological awareness (MA) in young Chinese speakers has usually been focused on urban populations where literacy resources are easily accessible. The setting of the current study is in rural China where the morphological development of young children is understudied and the presence of the home language and resource constraints can influence the effectiveness of literacy interventions. Mixed methods designs provide an approach that considers the contextual complexity of phenomena studied, and offer insider and outsider perspectives and a deeper understanding of the causes of effects demonstrated by quantitative results (Creswell & Clark, 2017).

The study also adopted a within-subject analysis to examine whether an intervention that focuses on explicit compound lexical structure instruction is a feasible approach to improve third-graders' Chinese vocabulary knowledge. All participants were pre-tested and post-tested on measures of MA and vocabulary knowledge. The participants received a 13-session intervention on compound lexical awareness over two weeks. The session comprised of teacher-led instruction, peer-to-peer shared book reading, and written assignments. The researcher conducted post-intervention semi-structured interviews to understand teacher's experiences of the intervention (Figure 3).

Figure 3

Data Collection Timeline



Note: Data from Chinese 3rd grade students (n=57) and two intervention teachers were collected. The intervention consisted of three phases, a pre-intervention, intervention, and post intervention phase. Qualitative data (QUAL) were collected throughout the three phases and quantitative data (QUANT) was collected in the first and last phase.

3.2 Site and Recruitment

Due to the time limitation of the dissertation project, school closures due to COVID-19 and COVID-19 restrictions of outside personnel entry into public school in Hainan, China, a criterion-based convenient sampling method was used and one public central township school in Lingao County in Hainan Province, China was selected to participate in the study. This school was chosen as the research site based on the following criteria: 1) the size of township schools is representative of rural central township schools in China and also provides an adequate sample size for the study and; 2) the local language, the Lingao language, is present in the school's ambient environment; 3)The school and teachers are responsive and accessible for the researcher to conduct the intervention remotely (e.g the teacher have access to computers and internet, the teachers can dedicate time towards teacher training, etc.).

The researcher contacted the central township school's headmaster and formally sent out an invitation letter to the school. The headmaster then sent out a teacher information sheet and consent forms to two third grade Chinese teachers in the school with similar teaching experiences (one teacher with 6 years of teaching experience and one teacher with 7 years of experience) and education levels (for both teachers, their highest degree achieved was a BA in Chinese teaching). Teachers had the opportunity to ask the researcher questions about the intervention study via WeChat. Once teachers consented to participate in the study. The classroom teachers then distributed parent information sheets and consent forms to students in their classroom and their families. Two days after passing out information sheets and consent forms, the researcher organized two optional online meetings on WeChat to address any inquiries parents may have regarding the intervention. Parents were invited by the classroom teachers to join. A short presentation of the study was given to the parents and a Q&A session was held after the presentation. Parents had one week to respond with their consent for their child to participate in the study (See Appendix C for invitation letters and consent forms).

3.3 Pilot Study

A pilot study was conducted to assess the developmental and cultural appropriateness of the assessment battery, and for the researcher to practice using assessment materials before the data collection process. The pilot study included three bilingual Chinese and Lingao adults and nine third-grade students from the local township school. The researcher ran three assessments, a Lexical Compounding Task (LCT), a Word Definition Test (WDT), and a home language cognate test (HCT), totalling approximately 1 hour per participant. Answers from the three adults were collected to evaluate the reliability of target responses based on the assumption that the native speakers of Chinese would be able to comprehend fully word meanings and apply lexical compounding rules. The adult's responses were evaluated by the researcher on the answer's quality and were given an average item score (Table 1).

The researcher tested the nine children over two days during school hours. To minimize the priming effect between the WDT and the LCT, the researcher counterbalanced the two tests where half of the participants first were tested the WDT, then the HCT, and finally the LCT, and the other half of the participants first tested for LCT, then HCT, lastly the WDT. Counterbalancing the testing sequence for the WDT and the LCT was necessary because the concepts tested for the two tests were highly connected and

a priming effect was observed in pre-pilots of the assessment. The performance of the nine children was rated individually by the researcher and an independent scorer on the quality of each answer. The independent scorer was provided a scoring rubric and had two scoring training sessions led by the researcher on the scoring scheme (Table 1).

Following the pilot, changes on the assessments and interventions were made based on the researcher's observations:

Removing HCT Test. The initial plan of this study incorporated the use of home languages as an element of the intervention to explore whether the use of home languages in the classroom may affect children's learning of vocabulary. However, the home-language integrated portion of the intervention and the HCT from the test battery was dropped. This adjustment was because children were testing at a floor level and did not display adequate Lingao language skills that would be able to support a home language integrated

Table 1

Descriptive Statistics on Children's and Adults' Performance in the Pilot Test of the Word Definition Task (WDT), Lexical Compounding Task (LCT) and Cognate Awareness Task (CAT)

Assessment		Adults (N=3)			Children (N=9)		
		M(SD)	Max	Min	M(SD)	Max	Min
WDT		106.33(2.89)	108	103	38.22(21.84)	80	10
LCT	Total Score	47.33(0.58)	48	47	28.33(11.86)	46	12
	Morphological construction Sub-Test	24(0)	24	24	16.67(6.42)	24	4
	Morphological Production Sub-Test	23.33(0.58)	23	23	11.67(7.48)	22	2
CAT		15(0)	15	15	1.62(1.32)	4	0

Note. The maximum score for the Word Definition Task is 108, for the Lexical Compounding Task is 48 (for each the morphological constructing and morphological production, the maximum is 24), and for the Cognate Awareness Task is 15. Minimum = Min., Maximum = Max.

intervention. Additionally, the classroom teachers were also not confident in teaching concepts of the home language in formal classroom settings. For a sample of the CAT, see Appendix E.

Reranking of Test Items. The test items were reranked based on an average score of adults' and children's answers to each test item from lowest score to highest. This adjustment was to minimise children's testing fatigue and anxiety early on that may potentially confound the validity of the remaining assessments.

Addition of cartoon video. The researcher introduced a short cartoon to the assessment procedure followed by a short discussion before the start of the test to familiarise children with the testing environment and building rapport with the researcher. Brown and Watkins (2013) observe that apart from contextual factors, such as testing environment, rapport between the assessor and the student can impact assessment validity. This video segment was added to settle the children into the activities and reduce anxiety to a novel situation. During the pilot, children seemed anxious, unable to respond to simple greetings, which greatly impacted assessment performance. The video content consisted of a 45 second video about blue whales. Children were prompted to discuss the video with the researcher after it was played. The video was selected because children have been seen to respond well to animal-related cartoons, and the content of the video depicted themes related to the test items. For example, for the Word Definition Task (WDT) , children were asked in the sample test item the meaning of the word 蓝鲸 [lan2 jing1] (blue whale). The video on blue whales aimed to prompt students to recall their knowledge and depictions of what the word "blue whales" meant.

Assessment Instruction Video. The researcher also recorded a three minute instructional video for the children that introduced the researcher, determined the assessment aim and process of the assessments. The video was played to the intervention classrooms on the first and second day of assessments to minimise children's unfamiliarity with an online testing format.

Word Definition Task Scoring and Test items. The scoring rubric for the WDT was amended from a 0-3 point scale to a 0-4 point scale to incorporate a more nuanced assessment of the depth of compound lexical understanding. Three items were also taken out from the far transfer sub-category to shorten the length of the intervention.

After providing details of the adjustments made post-pilot test, the paper will now describe the intervention, assessments and measures used, and teacher semi-structured interviews.

3.4 Intervention Materials and Procedure

The teacher-led intervention program builds upon theories of effective vocabulary learning and literacy learning through book reading, explicit instruction in MA and reciprocal learning. The intervention involved 1 week of teacher training and 2 weeks of 13 embedded vocabulary training sessions (Table 2). The intervention consists of two elements, teacher training and teacher-led vocabulary training sessions, each of which will be described below.

Table 2

Intervention Timeline

	Teacher-led Vocabulary Sessions	Teacher Training
Week 1		Self-guided study Live online training session
Week 2-3	Embedded vocabulary training sessions Student take home assignments	Daily refection survey Mid-intervention check-in
Week 4		Post-intervention semi-structured interview

3.4.1 Teacher-led Vocabulary Sessions

Lesson Plans. Vocabulary structure training was divided into three main modules, each addressing one type of subordinate compound structure: noun centred subordinate compound structure, adjective centred subordinate compound structure, and verb centred subordinate compound structure. Previous work showed that vocabulary learning is best achieved through a mixture of teaching methods such as dialogic teaching, explicit vocabulary instruction, shared book reading, etc. (National Reading Pane, 2000). The researcher planned 4 sessions for each sub-category of subordinate compound structure, with one review session at the end of the intervention, totalling 13 sessions over two weeks. An example of a module's session layout is depicted in Table 3.

The first session is the introductory session that aims for students to be able to familiarise themselves with both the storybook and the target words. Children are also asked to recall words that contain the same key morpheme as the target words to

prompt the concept of morphological compounding as it relates to the meaning of the words. The second session explored the structure of the target words. Children were asked to complete a shared book reading exercise with the intervention book and fill the target words into the mind map. The mind map requires children to fill in the correct morpheme into the corresponding boxes that represent the decomposition of compound words. Children are asked to review their mind map after class and correct any errors that have occurred. The third session facilitates children's knowledge transfer of the key morphemes to other vocabularies. Children are required to find other words that have the same central morpheme and compound word structure as the target word. Children are also asked to write these words on their mind map. The fourth session is a revision session that summarizes the content learned and identified areas that the students feel challenging so that the teacher may provide further instruction. For an example of a classroom activity, see Appendix H.

Children's Book. To ensure both the cultural appropriateness and smooth incorporation the target words in a book used for the intervention, the author co-wrote the book with a local artist "Huihui's Night at Sea". Picture books are widely recognised as a tool for enhancing literacy and vocabulary during early literacy and primary education. A review of the literature on culturally sensitive and effective picture books for literacy learning, the researcher aimed that the development of the book would include rich lexical variety, culturally appropriate encounters and dialogue, easy to follow plotlines and culturally sensitive illustrations (Mesmer, 2016; National Reading Panel et al., 2000; Senokossoff, 2013; Simoncini et al., 2019; Temple, 1998). The book consisted of four chapters with three teacher-led reading chapters and one self-study chapter at the end of the book. The length of each chapter averaged around the same length as an article in the children's 3rd grade textbook, which was approximately 500 to 800 words per chapter. A sample of the children's book is shown in Appendix G.

"Word Builders" Word Map. Children were given in-class and take home assignments in the form of word maps that supported children's review of knowledge and connection of new concepts to past knowledge. Literature shows that by pairing morphological activities with explicit instruction, children are more likely to not only show interest but also demonstrate deeper understanding of morphological concepts (Carlisle, 2010a). Specifically, morphological problem solving, or comprehending the grammatical associations and definitions of morphemes, may play a crucial additive role in solidifying

Table 3.

Example module: Module 1 noun-centred subordinate structure

Target words	Session	Objective	Example Activities	Example guided questions
夜幕 [ye4 mu4] (night sky) 原料 [yuan2 liao4] (raw material) 鱼贩 [yu2 fan4] (fishmonger)	**1**	Introduces to how words are comprised of different components and is able to demonstrate that understanding through a word map	Teacher storybook reading small group discussion of words containing the central morpheme	Can you find where the target word is in the book? Have you learnt these words before Can you guess the meaning of the word? Have you learnt the characters within this word?
	2	Explores a noun-centred subordinate structure and how this contributes to the word's meaning	Peer group reading Explicit instruction of the noun-centred subordinate structure Small group discussion of the word cloud	Are all the words that contain the central morpheme of the same structure? Can we find out their meaning from the structure of the word? Does the meaning of the passage change when we replace the target words with words we came up with?
	3	Extends the understanding of noun- centred word structures to other words	Small group work: discovering words in the book with a noun-centred subordinate structure	Can you find other structures in the book that have a noun- centred subordinate structure? How do you know that it's the same structure? Can you guess the word's meaning from the target structure?
	4	Review of content learnt	Review mind-map and common errors	What were some of the common mistakes in your group? How did knowing the word structure help you understand the word?

MA learning (e.g identifying and correcting errors: Nunes & Bryant, 2006 ; inventing new words: Elbro & Arnbak, 1996 ; detect the shift in meaning when using different words: Henry, 2003; analogical reasoning: Birgidottir et al., 2006). The design of the "Word Builders" Word Map follows this theory of integrating morphological problem solving as an activity through vocabulary mind maps. As children fill the word maps, they are required to recall key words, create new word from existing morphemes, correct past mistakes, and compare and contrast the meanings of words that share the same morpheme. A sample of the "Word Builders" word map is show in Appendix H.

3.4.2 teacher training

The intervention trained Chinese teachers of the two intervention classrooms through a mix of self-learning material, pre-intervention online live training and weekly check-ins. The intervention provided teachers with both a thorough understanding in compound word structure concepts, as well as the theories behind the intervention. The training also provided teachers with detailed lesson plans for each intervention session and mock lessons before the implementation of "Word builders".

Self-Learning. A 20 page teacher manual written by the researcher was send to the teachers pre-training, along with short instructional videos that focused on theoretical concepts behind the intervention's rational. These self-learning modules covered word structure concepts, instruction through story reading, and reciprocal learning. After going through the self-learning modules, teachers would send questions and small reflection notes in teacher training WeChat group. The researcher would provide daily comments and responses to teachers' inquiries. The teacher self-reported their study time to approximately 4 hours in total. For a sample of the teacher training manual, see Appendix F.

Live Classes. Live classes would take place remotely two weekends pre-intervention, totalling 6 hours of training. Live classes would primarily go through the lesson plans of the intervention and allow the teacher to have an opportunity for a mock class. For the first week, the teachers focused on understanding the three sub-categories of the subordinate compound word in theory. The teachers were also asked to facilitate a small group discussion during regular class sessions and reflect on their experience facilitating small group discussions. This small-group reflection process was introduced prior to the intervention was because reciprocal learning and small group discussions was not a common teaching strategy used in the classroom, yet would be a crucial element to teaching methods used in the intervention. Teachers were able to familiarize themselves

with novel teaching strategies before the intervention takes place so that the intervention may be delivered at a higher quality.

Weekly Check-ins and Daily Reports. During the intervention, the teachers were sent reflection surveys at the end of each session to fill out, detailing how well the teachers saw the implementation of the lesson plan. The researcher would review teacher surveys at the end of the day and provide feedback and suggestions on each session. At the end of the first week, the researcher held a 1 hour check-in. The check-in content surrounded themes raised in the reflection surveys, daily teacher messages, and teachers' reflection on the week. After hearing the teachers' comments, the researcher discussed her observations and comments with the teachers and provided suggestions on how to best provide teaching instruction and improve teacher child interactions.

3.5 Assessments and Administration

Because there are no available standardized tests for outcome measurements relevant to this study's intervention effects, experimental tasks for morphological compounding and word definition was independently developed by the researcher.

Words from both the WDT and the LCT sets were chosen by selecting characters and vocabulary from the children's current textbook. The researcher chose the Chinese textbook as a source of the word sets because children would have equal exposure to the test items. Texts from the Chinese Third Grade Second Book (People's Education Press, 2018) was extracted and imported to the Natural Language Processing and Information Retrieval (NLPIR) software, a software commonly used in Chinese natural language processing in Chinese scholarship, to categories and select for subordinate lexical compounds. The filtered vocabulary were then checked for word frequency using the Peking University Modern Chinese Corpus (PKUMCC). The corpus was selected because the language database included in the corpus was modern based literacy texts including news articles, online media sources, modern literature works, and children's books, which mimicked the language and literacy environment of the participants (Peking University Center for Chinese Linguistics (PKUCCL), 2021). Word frequency for selected words was controlled at a low-frequency so that the children would find the words relatively unfamiliar and their only exposure would have predominantly came from textbooks.

Due to COVID-19 the researcher was unable to be on site for data collection, thus, a laptop was brought in by a research assistant so that the researcher may conduct individual assessment remotely via Microsoft Teams video call. For the administration of test items, the researcher would share a PowerPoint through the screen share function in Microsoft

Teams. During the assessment, the research assistant was present to ensure that the testing equipment was running smoothly and to assist students' use of the testing equipment. The length of an individual assessment took approximately 30 minutes and all testing was administered in a quiet room in the school individually by the researcher within a 1-week range during school hours. During the pre-test, the researcher played a cartoon video for the child before their assessment and followed with a short discussion of the video content to ease children into the assessment. The researcher counter balanced the testing sequence of the WDT and LCT throughout the day so that half of the morning session and the afternoon session were first tested on the WDT, then the LCT, and the remaining half was tested in the reversed sequence. During the post test, the researcher found that children were more comfortable and familiar with the online testing sequence and did not require a long ease-in process. Thus during the post-test, the video was no longer played before the assessments. The two tasks (LCT and WDT) administered to the students are described below.

3.5.1 Lexical Compounding Task

Children's Lexical Compounding Task (LCT) comprised of using two sub-tasks: the morphological construction task and the compounding production task. The task had a total of 12 test items, with 6 items for each the sub-tests: morphological construction task and the compounding production task.

This task follows a zero to four point scoring rubric modified from the scoring scale used in Liu and McBride-Chang (2010) for the scoring to be more sensitive towards detecting compound lexical awareness. Three points were allotted for an answer that had both a correct structure and represented critical themes and morphemes; a three point answer would include unnecessary morphemes; a two point response missed the meanings of subordinate morphemes but had a correct structure; one point responses included the critical morpheme yet did not have the correct structure; zero points were given to irrelevant or incorrect answers. The complete LCT battery is provided in Appendix E.

Morphological construction task. The morphological construction task follows similar question structures used in previous studies (Liu et al., 2013; Liu & McBride-Chang, 2010) where children are given a scenario, such as, "when the sun goes down at night, we call that a sunset. What would we call it if the moon went down at night" (Chen et al., 2008; McBride-Chang et al., 2003, McBride-Chang, et al., 2005). The aim of this task is to see if Children are able to construct a similar word structure of the compound words in the given scenario. The task contained six items, two items for each subcategory of subordinate structure morpheme construction: a) a noun modified by a subordinate

morpheme, or (adj/n / v)+ n; b) an adjective modified by a subordinate morpheme, or (adj/n/v) + adj; and c) a verb modified by a subordinate morpheme, or (adj/n/v)+v.

Compounding Production Task. The morphological construction task follows similar question structures used in previous studies (Liu et al., 2013) where children are asked to produce novel words not used in real speech based on a definition/scenario. For example, a child may be asked "What do you call the roar of a lion (狮子的吼叫可以叫什么)?" A correct response would be "lion-roar（狮吼）". The aim of this task is to see if Children are able to construct a structure of the compound words without the presence of an analogous scenario. Similar to tasks before the task contained six items, two items for each subcategory of subordinate structure morpheme construction: a) a noun modified by a subordinate morpheme, or (adj/n / v)+ n; b) an adjective modified by a subordinate morpheme, or (adj/n/v) + adj; and c) a verb modified by a subordinate morpheme, or (adj/n/v)+v.

3.5.2 Word Definition Task

The Word Definition Task (WDT) was administered to test children's vocabulary knowledge, specifically vocabulary depth. This task contained one trial item and 27 test items. The test item included three categories of words, taught words (three for each sub-category), near transfer words (three for each sub-category), and far transfer words (two for each sub-category). The administer shared a PowerPoint slide with the test item written on the screen in SongTC sized 120 through Teams. For example, to assess the child's understanding of the word 蓝鲸[lan2 jing1] (blue whale), the administer shared on the computer screen the target word and ask the child the word definition, "你觉得蓝鲸什么意思？ (what do you think blue whale means) ?". Before officially starting the test, the administrator will provide the child with two example items and guide children towards the highest possible score. After ensuring the child's comprehension of the task, the administrator will officially start the task. Throughout the task, the administrator provided prompting questions to ensure the child's level of comprehension is accurately represented.

The assessment followed a zero to four-point scoring rubric modified from the scoring scale used by Nag and colleagues (2014) to be more sensitive towards assessing children's comprehension and decoding of compound words. A score of four was given for definitions that demonstrate an understanding of key morphemes in the compound word by decomposing a compound word or giving synonyms that precisely represent all morphemes of the compound word. For example, if the child is asked the meaning of "洒落" [sa3 luo4]

（sprinkle down）, a four-point answer could be “洒着着落下来”（something falling in a sprinkling motion） because the answer demonstrated the child’s ability to deconstruct a word and recombine to define it. An answer would be allotted three points for accurate definitions that miss themes from the subordinate morpheme. For example, a three-point response for defining “寂静”[ji4 jing4] (serenity) is “安静”[an1 jing4] (quietness), because this answer did not describe the type of quietness that was represented by the subordinate morpheme. A score of two would be for responses that gave descriptions or sentential use of the word. A one-point response consisted of idiomatic phrases, partial explanation of the morphemes within compound words, or repeating the word with an inflection. Zero points would be for irrelevant or no response. A complete list of words used in the WDT is provided in Appendix D.

3.6 Post-intervention Teacher semi-structured interview

Semi-structured interviews were conducted with the intervention teachers post-intervention. Semi-structured interviews refer to an interview format that uses open-ended questions to address a set of topics, as opposed to highly structured, pre-planned sequential questions (Merriam & Tisdell, 2015). A semi-structured interview may offer the interviewee the space to present their thoughts and reflections while converging the content of the interview to more targeted themes (Holstein & Gubrium, 1997; Merriam & Tisdell, 2015). This interview structure was fitting for the study since the aim of the interviews was to understand the teacher’s experience of the intervention, including the teacher training, the vocabulary training series, and the materials used. The interview was 45 minutes, with a total of 15 questions (for the semi-structured interview questions, see Appendix I). The interview was audio-recorded via Microsoft Teams video chat, then transcribed via Microsoft Word’s transcription tool, and the transcript was verified by the researcher.

3.7 Analysis

Because this study utilizes an embedded quasi-experimental design (Creswell & Plano Clark, 2017), the qualitative and quantitative datasets were collected and analysed separately, then contrasting and corroborating findings were explored. Pre- and post-test were analyses through appropriate statistical tests. Teacher semi-structured interviews were analysed through a systematic analysis. This section will now describe each dataset’s analytical approach.

3.7.1 Quantitative analysis of pre and post-test data

All data was analysed using the Statistical package for the Social Sciences (IBM SPSS-Version 27.0). The choice of the appropriate statistical test was determined first through testing whether the data fit the appropriate five assumptions for parametric tests: 1) whether the level of measurement uses a continuous scale, 2) whether the sample is representative of the population researched, 3) if the observations in the data are independent from one another, 4) if the data is normally distributed, and 5) if there is equal variance to each score obtained (Field, 2013).

The first research question was addressed through three quantitative analysis strategies. The first area of inquiry focus on the change in literacy skills following the intervention. Because data collection was conducted at two time points on the same group of children, In the case that parametric test assumptions are met, a paired-samples *t*-test would be appropriate two compare the significance of change between the children pre and post test results. The second area of inquiry investigates the transfer effect of the intervention by comparing between taught, near and far conditions of a within-subject sample. For this reason, an Analysis of Variance (ANOVA) test was performed to compare the differences between the three groups. The third area of research looked at the relationship between pre-test scores and improvement post-intervention. Thus the researcher chose a Pearson's correlation coefficient analysis to explore this link. The next chapter will use relevant assumptions tests to determine the appropriate statistical test for the study using the aforementioned steps.

3.7.2 Qualitative analysis of interviews

A thematic analysis of teacher interviews was conducted to better understand children's learning progress and teacher's experiences of the intervention. The qualitative analysis consists of data organisation, decomposition, codification, synthesis, and pattern identification (Bogdan & Biklen, 2007). While there is a wide variety of techniques used to analyse qualitative data (Punch & Oancea, 2014), this section will breakdown how qualitative data was analysed in this study and the rational for the analysis method selected.

The semi-structured interview conducted with the intervention teachers on their experiences was analysed through a thematic analysis. A thematic analysis refers to a way of organizing data into themes or categories through a set of coding schemes to make meaning, find patterns, and provide rich and detailed accounts out of complex qualitative data (Clarke & Braun, 2014; Merriam & Tisdell, 2015).

The interviews were conducted remotely via teams and were audio-recorded through the Teams audio-recording function. The audio-recording was then transcribed verbatim and the original recording was destroyed to ensure confidentiality. The coding process was conducted on Nvivo 1 Software and referenced Cohen et al.'s (2002) guidelines on content analysis and followed Merriam and Tisdell's (2015) structure of thematic analysis: the data is first segmented into units meaningful to the research question, coded into categories derived from the segmented units, then consolidated into themes by connecting and merging related categories, finally developed into a narrative framework.

3.8 Reliability and Validity

Reliability and validity address the level of dependability, stability, and accuracy of the instruments, measures, and procedures used in a study (Cohen et al., 2002). In quantitative research, reliability refers to how replicable and consistent the research instruments are overtime for a particular group of participants, while validity refers to whether the instrument is measuring the construct it intended (Cohen et al., 2002; Field, 2013). It is crucial to ensure the reliability and validity of the measurements and instruments used in this study since the field of MA in Chinese lacks standardised instruments and measures.

Validity was considered in terms of content validity, construct validity, ecological validity, and external validity (Cohen et al., 2002). External validity could not be ensured due to convenient sampling. However, the evaluation of the remaining dimensions of validity was checked with the process demonstrated below.

Measurement validity refers to how items on a test represent the entire domain the assessment aims to measure (Salkind, 2010). To ensure measurement validity, the researcher piloted the assessments so the instruments used fully captured children's morphological compound awareness and vocabulary knowledge in both tests according to literature. The researcher provided multiple testing formats for one construct to ensure that the different facets of the construct was tested. The study also designed the assessment procedure to be culturally sensitive. The cultural sensitivity of the measurement tools directly related to the study's content validity (Dumas et al., 1999). The pilot tests both verified that children were able to comprehend and demonstrate their morphological compound awareness. The researcher amended post-pilot both the test items and scoring rubric so that the instruments were sensitive towards compound lexical awareness. For

example, apart from picking up the depth of word definitions, the WDT scoring scheme also included children's ability to decompose compound words.

Construct validity relates to whether test items truly measure the construct it seeks to measure (Cohen et al., 2002). In terms of construct validity, the study carefully analysed existing measures and instruments in the literature on MA and compound lexical awareness that demonstrate strong reliability and validity. For example, the researcher reviewed 6 types of assessment strategies of MA and based the WDT upon established and validated vocabulary definition tasks and theories in compound word learning in the field (Atkinson, 1991; Chen et al., 2008; Lau et al., 2011; Liu et al., 2013; Liu & McBride-Chang, 2010; Pearson et al., 2007; Williams, 1997). The researcher ensured that the instruments used in this present study were aligned with existing theoretical constructs.

Ecological validity is concerned with whether the outcome and findings of the research apply to natural social settings (Cohen et al., 2002). Ecological validity was ensured through pre-intervention communications with the research site to ensure that materials and instruments used in the study were culturally appropriate. Teachers of the school were consulted on the developmental appropriateness of the intervention materials (homework, children's books). The research was also designed to be led by teachers, thus replicating realistic settings of vocabulary training in schools.

This study addresses reliability in terms of the level of internal consistency and equivalence using student's pre-test data (Cohen et al., 2002). The reliability of the test was ensured by controlling for elements of the assessment to be consistent and replicable. Internal consistency refers to how well the test is measuring what it aimed to measure, and was tested through the split-half test (Cohen et al., 2002). The LCT test showed moderate reliability (split-half reliability =0.64), and the WDT showed high reliability (split-half reliability =0.85) (Field, 2013). For SPSS output of reliability testing, see Appendix J.

Equivalence reliability in intervention studies can be achieved when pre and post-test instruments are of equivalent forms. Since the pre and post-test assessments are the same set of test batteries, this ensures equivalence reliability. However, reliability in terms of stability could not be reported because time limitations did not allow for test and retest procedures.

3.9 Ethics

The Central University Research Ethics Committee (CUREC) has approved this study (approval reference: CIA-21-241, Appendix A). This study also followed ethical

guidelines of the British Psychological Society (BPS) and the British Educational Research Association (BERA). The study faced potential ethical concerns pertaining to: confidentiality and data protection relating to conducting research remotely, obtaining informed consent from a vulnerable population, and the sharing of findings.

3.9.1 Informed Consent

Inform consent was obtained from all participating subjects, including the school, the teachers, and the students. The school principal was briefed regarding research aims, researchers' responsibilities, and how the school may cooperate. The researcher set up two meetings with the principal to answer any questions the principal may have. The teachers and principle were sent out project invitation letters (For the letter to the headteacher and intervention teachers see Appendix C) and project information sheets that contained details of the research project designs, goals, the teachers' responsibility, etc. After having permission from the principal and classroom teachers, the researcher then sent out project information sheets and consent forms to the parents via each class's classroom teacher. The researcher obtained informed consent from the children through their parents as the students were under 18, following guidelines of CUREC that states children under 18 are not able to give informed consent (CUREC, 2021).

During this process, there was a potential risk that parents would feel that by not consenting that their children would be "missing out" on learning opportunities. Thus, parents were reassured that children would still be able to participate in daily training and curriculum without consenting to the assessments. There might also be a potential risk of the parents forcing the children to participate in the assessments. Therefore, before each assessment, children would also be asked to give oral consent to taking the assessments. All participants had the right to withdraw at any stage of the study by informing the researcher without explanations.

3.9.2 Confidentiality and Data Protection

All data collected were stored in secure online and physical storage systems and was anonymised through unique identification codes assigned to children and aliases for the teachers. Since due to COVID-19, all data transfer processes happened remotely and online. Thus, the researcher ensured that physical data was safely digitalised and transferred to an encrypted online file with the University's network (Nexus365 OneDrive). Any audio-recording was transcribed immediately after the recording and the original recording

was destroyed. Any physical data was also destroyed after digitalization. (See Appendix B for Data Protection Impact Assessment (DPIA) form and approval email)

During the communication, issues arose with the school administration concerning the potential of a data breach. School administration was concerned by the online nature of the research process and was unfamiliar with the CUREC approved platforms for online communication (e.g Microsoft Teams).

3.9.3 Cultural Appropriateness and Participatory Research

While adults as authority figures over children are present in many settings, this perception is heightened in rural China. Participating children may perceive an unequal relationship between the researcher and themselves because of the age difference and the traditional roles of hierarchy between students and teachers. The researcher reassured that children at the beginning of each test that they are free to opt out of the assessment in the study. During the administration of assessments, the researcher will also make sure to present the assessment warmly and gently, reassuring the child that they can refrain from answering if they wish to do so. The children's parents and school staff will also be briefed by the researcher on the voluntary nature of the student's participation.

The school administration culture can also be hierarchal. Participating teachers may perceive that the training is school-mandated, thus forming an unequal relationship between the researcher and themselves. Apart from stating the voluntary nature of the intervention during the informed consent briefings and handouts, the researcher will stress to the teachers before the teacher training that their participation in the project is voluntary.

Traditionally, in intervention studies, communities who are participants of the experiment are often not given the platform to voice their input or provide contextually sensitive and relevant input to the design of the study (Kara, 2015; Leykum et al., 2009). The Hainanese community was included in the iterative process of the teacher training and curriculum design. The process was achieved through collaboration with school administrators and teachers to ensure the cultural sensitivity of the research and that the research may benefit the participants both short-term and long-term. For example, for the design of the children's book, local artists were included to provide culturally representative illustrations of the Hainanese people and the landscape, and local fishermen's stories were adapted into story plotlines. The teachers were included as editors of the book and provided insight into the story's cultural appropriateness and content's difficulty level. The participant's input is pertinent to the applicability of the implementation and design

since the primary purpose of the study was to evaluate the feasibility of a teacher-led intervention.

CHAPTER 4 RESULTS

First, this chapter will cover descriptive statistics from the assessments used in the study to demonstrate student's overall performance. Second section will address specific research questions using inferential statistics. Third section will report on post-intervention teacher interviews using a thematic analysis on the embedded qualitative data.

4.1 Descriptive Statistics

The initial stage of data analysis was carried out by exploring the descriptive statistics from pre- and post-intervention assessments. Overall, the mean score for post-test measures were higher than that of the pre-test for both the LCT and the WDT.

4.1.1 Lexical Compounding Task

The LCT was designed to explore how the intervention affected children's morphological compounding awareness. The descriptive statistics of the LCT are shown in Table 4.

Table 4

Descriptive Statistics of Pre- and Post-Test for Lexical Compounding Task and Sub-tasks (N=57)

Task (Maximum Score)	Time	Mean (Std. Deviation)	Minimum	Maximum
Total (48)	Pre-Test	28.81 (9.06)	7	48
	Post-Test	37.91(7.80)	18	48
Morphological Production Sub-task (24)	Pre-Test	11.23(5.08)	1	24
	Post-Test	15.95(5.28)	6	24
Morphological construction Sub-task (24)	Pre-Test	17.58(6.03)	0	24
	Post-Test	22.21(3.811)	5	24

4.1.2 Word Definition Task

The Word Definition Task was designed to test students' vocabulary depth, specifically vocabulary depth for compound words. In this task, students were also performing better in the post-test across all measures in comparison to the pre-test. Descriptive statistics for the word definition task are presented in Table 5.

Table 5.

Descriptive Statistics of Pre and Post Test for Word Definition Task (N=57)

Task (Max. Score)	Time	Mean (Std. Deviation)	Minimum	Maximum
Total (96)	Pre-Test	34.49 (14.83)	3	76
	Post-Test	62.93(17.08)	13	88
Taught (36)	Pre-Test	12.51(5.68)	2	28
	Post-Test	24.51(6.74)	4	35
Near (36)	Pre-Test	12.39(5.72)	0	30
	Post-Test	23.4(6.18)	5	33
Far (24)	Pre-Test	9.6(5.18)	0	22
	Post-Test	15.02(5.68)	4	24

After presenting the descriptive statistics, the following sections will address the study's research questions.

4.2 Does an intervention that focuses on systematically instructing on Chinese compound lexical structures affect third graders' Chinese vocabulary knowledge?

This broad research question will be addressed through three sub-questions: one primary research question (section 4.2.1) and two supplementary research questions (sections 4.2.2 and 4.2.3)

4.2.1 Does targeted training in Chinese compound lexical structures increase children's compound lexical awareness and vocabulary depth?

The study addressed the primary research question by comparing the pre and post-test performance on the LCT and WDT through paired samples *t*-tests. A paired samples *t*-test is standardly used for studies with a within-group experimental design (Field, 2013).

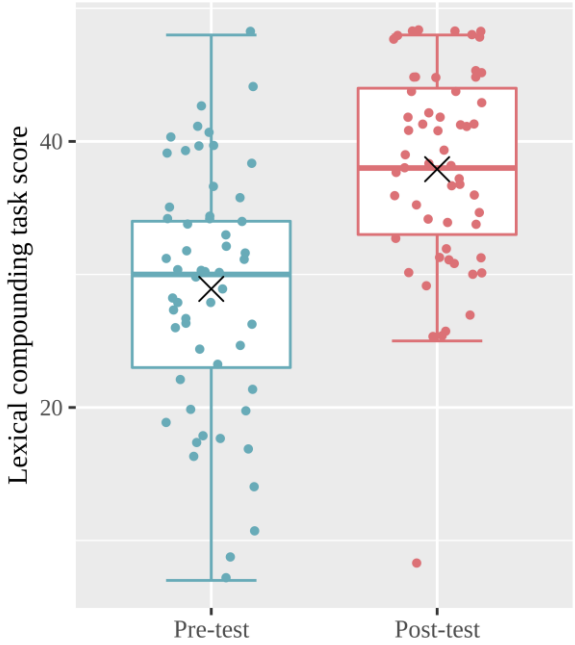
Assumptions were checked prior to the analysis. A paired *t*-test requires the dependent variable to be continuous, pre-test and post-test score differences should follow normal distribution, and that the observations are independent of one another (Field, 2013). The assumption of normally distributed differences was evaluated by inspecting if the data's skewness fell within the range of -2 to 2 and kurtosis fell within the range of -9 to 9 (Posten, 1982). The assumption of normality was met as the skewness and kurtosis of pre-

and post-test score differences for LCT (Skewness: 0.49; Kurtosis: 1.24) and WDT (Skewness: - 0.34; Kurtosis: -0.08) fell within the required range.

For the LCT there was a highly significant difference between the pre-test (T1) (M = 28.81, SD = 9.06) and post-test (T2) (M = 37.91, SD = 7.80); t(57) = -7.52, p < 0.001). Thus, the null hypothesis that there is no difference between the means of the pre- and post-test was rejected. This result suggests that the lexical compound awareness intervention improved children's morphological compound awareness (Figure 4).

Figure 4

Boxplots Comparing Scores of the Lexical Compounding Task During Pre- and Post-Test

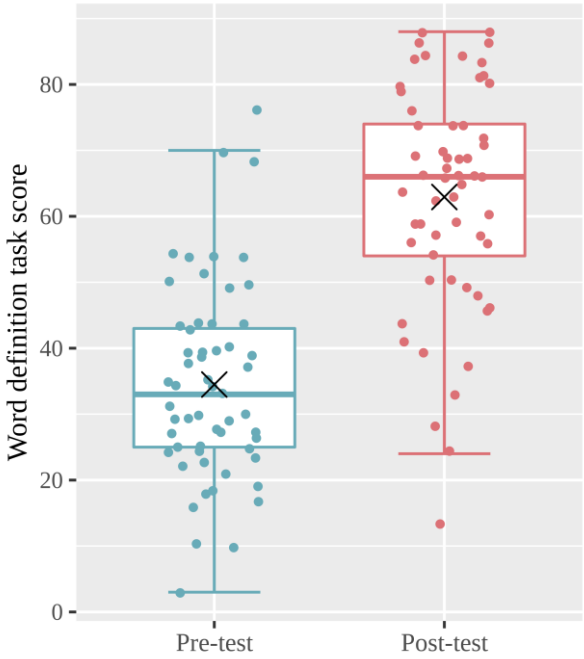


Note. Chinese 3rd grade students (n=57) were assessed prior to and after a targeted intervention in Chinese compound lexical awareness. Bold lines inside the boxes correspond to the median score within each group, cross symbols (×) represent the mean value, and the boxes depict the interquartile range (middle 75% of the distribution). Each dot represents an individual student.

For the WDT there was a highly significant difference between the pre-test (T1) (M = 34.49, SD = 14.83) and post-test (T2) (M = 62.93, SD = 17.08); t(57) = -11.67, p <0.001). Therefore, the null hypothesis that the mean of the WDT's pre- and post-test are equal was rejected. This result suggests that the intervention increased children's vocabulary depth (Figure 5). For SPSS output for assumptions testing and paired samples t-test, see Appendix K.

Figure 5

Boxplots Comparing Scores of Comparison of the Word Definition Task between Pre- and Post-test



Note. Chinese 3rd grade students (n=57) were assessed prior to and after a targeted intervention in Chinese compound lexical awareness. Cross symbol (×) represents mean value. Each dot represents an individual student.

4.2.2 Does the vocabulary knowledge of taught words from targeted training in compound lexical structures transfer towards novel words?

This secondary inquiry evaluates the extent of transfer effect, namely how much vocabulary knowledge of taught words from the intervention might transfer towards same lexical structured words that either share the taught vocabulary's head morpheme (near transfer) or have different morphemes (far transfer).

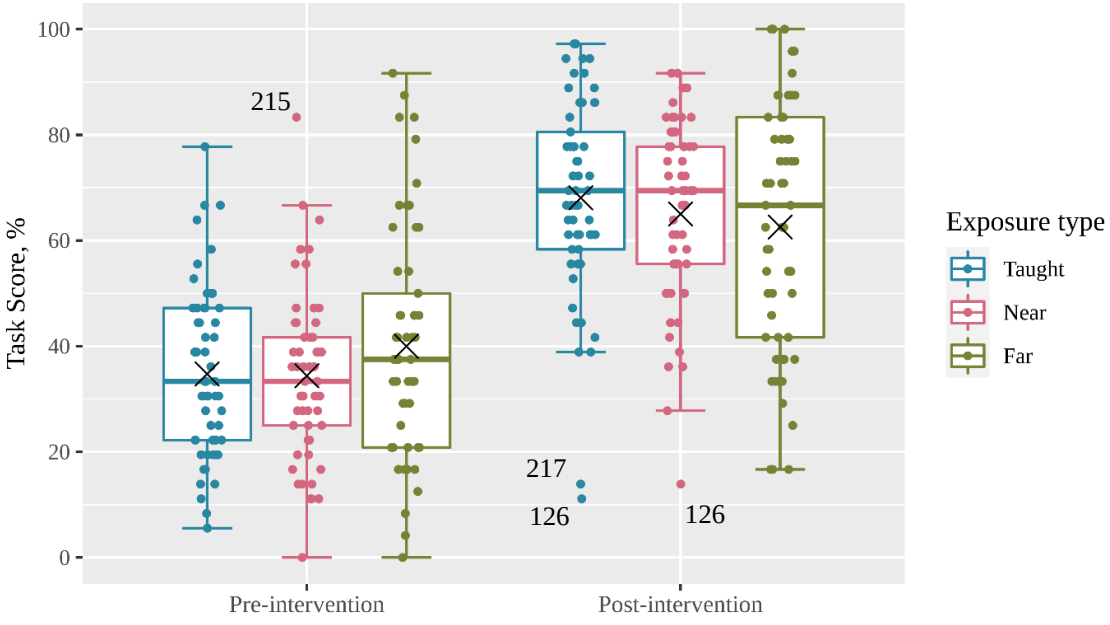
A two-way (2X3) repeated measures ANOVA with two within-subjects variables was chosen because this test is seen as a powerful statistical test when comparing two or more groups of small sample sizes, and that the data collected is of the same participants across two time points (Field, 2013; Pallant, 2013). Four out of the six assumptions required for running the test were satisfied in this study: 1) the dependent variable, in this case task score, was continuous; 2) the two independent variables consisted of two or more groups: pre-test (T1) and post-test (T2) for the Time variable; taught (directly instructed words), near (words with a shared head morpheme), and far (words with the same lexical compound structure) for the Nature of Exposure variable), ; 3) The observations were independent; and 4) variables of interest were normally distributed (Field, 2013).

However, assumption for sphericity was not met by either the within-subjects factors. Thus, the lower-bound estimate, a relatively conservative correction for sphericity in ANOVA, was used to correct for the data's violation of sphericity. Since there were unequal test items between the three types of exposures (WDT sub-tasks), the sub-task scores were converted to percentages to allow for subtask-to-subtask comparisons. The data also showed three outliers, which violates the normality assumption required for an ANOVA (Pallant, 2010; Field 2011). In order to more accurately represent the general trend of the data and increase the reliability of the test, the three outliers identified in SPSS were removed from the analysis. Thus, the ANOVA was performed with a total of 54 participants.

Results of the two-way (2X3) repeated measures ANOVA with within-subject factors Time (T1 and T2) and Nature of Exposure (Taught, Near and Far) showed that there was a significant effect of time ($F(1, 56) = 124.03$, $p < 0.001$), indicating that the

Figure 6

Participants' Pre- and Post-test mean scores in Word Definition Task based on the Exposure Type



Note. Boxplot of percentage scores obtained from the Word Definition Task grouped by the type of exposure (taught, near, far). Chinese 3rd grade students (n=57) were assessed prior to and after a targeted intervention in Chinese compound lexical awareness. Bold lines inside the boxes correspond to the median score within each group, cross symbols (×) represent the mean value, and the boxes depict the interquartile range (middle 75% of the distribution). Each dot represents an individual student. Three individual students' scores were found to be outliers, marked by their unique identifier number in the graph (215, 217, 126).

intervention improved students' average scores on WDT. This test was consistent the previous *t*-test results that showed a significant difference between pre-test and post-test WDT scores.

The effect of the Nature of Exposure, however, yielded insignificant results ($F(1, 56) = 0.75$, $p = 0.38$), which indicated that there was no significant difference in the improvement of WDT scores across the three word types. This demonstrates that there may have been a high degree of transferability between the three types of exposure. Figure 6 shows an increase from pre- to post-test for all measures. (See Appendix L for SPSS output for assumptions testing and ANOVA). (See Appendix L for SPSS output for assumptions testing and ANOVA).

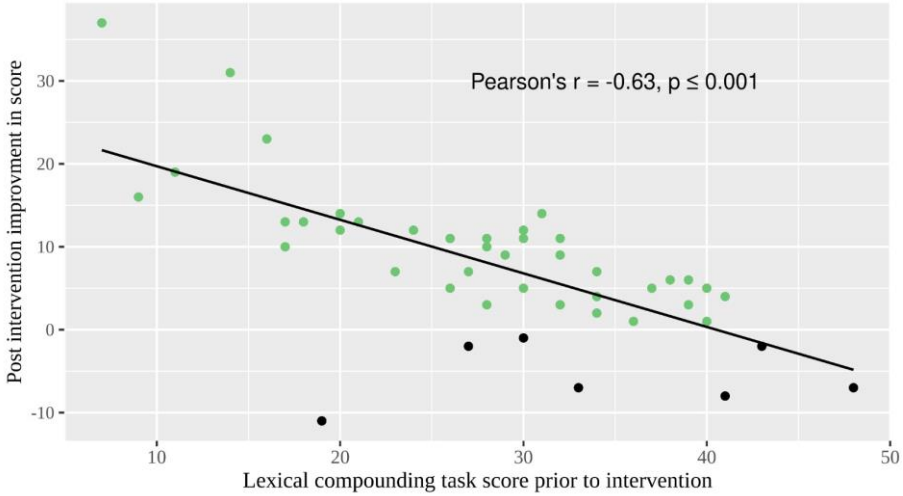
4.2.3 Is there a relationship between initial skills in vocabulary depth and morphological compound awareness and their improvement post-intervention?

An additional secondary inquiry inspects how initial skills in vocabulary knowledge and MA may impact student's level of improvement. This question is addressed through a correlation analysis between students` pre-test scores of LCT and WDT and the post-test improvement in the two respective assessments. Assumptions of linearity and normality must be met in order to conduct a Pearson's correlation analysis. Scatter plots showed a linear relationship between pre-test scores and post-test improvement for both LCT and WDT, and previous analysis showed normal distribution of the variables. Thus, a Pearson's correlation analysis was conducted to test the relationship between the pre-test performance and post-test improvement. This study will use guidelines on the Pearson's correlation coefficient developed by Cohen (1988) to determine the strength of a relationship: a weak correlation is $r = 0.10$-0.29, a moderate correlation is $r = 0.30$-0.49, and a strong correlation is $r = 0.50$-1.00. Because eight of the participants in the study reached ceiling for their post LCT scores, the full improvement could not be reliably captured by the assessment for these students. Thus, to more accurately represent the correlation between pre-intervention scores and the student's full range of improvement, these eight participants were removed from the analysis.

A strong negative correlation was observed between pre-test LCT scores and improvement on the post-test LCT assessment, $r = -0.63$, $p \leqslant 0.001$. This association meant that the higher a student scored on the pre-test LCT, the more likely thatstudent would improve to a lesser extent in comparison to a low pre-test scoring student (Figure 7).

Figure 7

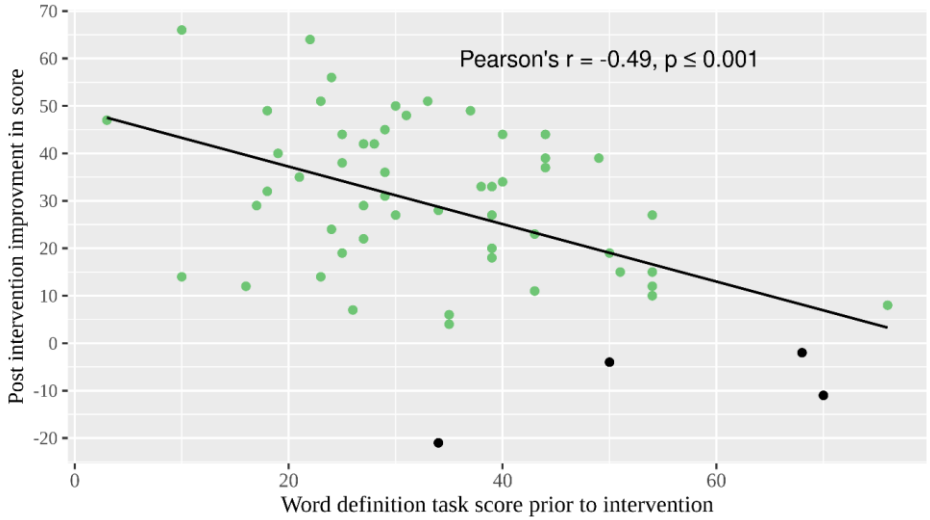
Scatterplot and Linear Regression of Improvement in Lexical Compounding Task (LCT) and Pre- LCT



Note. A Scatterplot with a regression line superimposed to represent the relationship between post intervention improvement score and pre intervention score for LCT. Chinese 3rd grade students (n=57) were assessed prior to and after a targeted intervention in Chinese compound lexical awareness. The green dots represent students that have improved post-intervention. Black dots represent students who scored a lower score post-intervention compared to pre-intervention scores. The regression line implies that poor initial skills in MA are associated with a greater post-intervention improvement (r=-0.63)

Figure 8

Scatterplot and linear regression of Improvement in Word Definition Task (WDT) and Pre- WDT



Note. A Scatterplot with a regression line superimposed to represent the relationship between post intervention improvement score and the pre intervention score for WDT. Chinese 3rd grade students (n=57) were assessed prior to and after a targeted intervention in Chinese compound lexical awareness. The green dots represent students that have improved post-intervention. Black dots represent students who scored a lower score post-intervention compared to pre-intervention scores. The regression line implies that poor initial skills in vocabulary knowledge is associated with a greater post-intervention improvement (r=-0.49).

The scatterplot also demonstrated that seven students scored lower in the post-test in comparison to the pre-test.

A similar negative relationship was found between pre-test WDT scores and improvement on the post-test WDT, $r = -0.49$, $p \leqslant 0.001$, indicating that there is a moderate negative correlation between the two variables. A scatterplot and a regression line showing this trend is presented in Figure 8). Similar to the LCT, the WDT scatterplot presented four students that scored worse in the post-test compared to the pre-test. For SPSS output for Pearson's correlations, see Appendix M.

4.3 What are teacher's perspectives and experiences of the Lexical Compounding Awareness intervention?

This question was answered by conducting a thematic analysis on post-intervention teacher feedback interviews. Thematic analyses is a common tool in qualitative research to understand and describe people's thoughts, perspectives, emotions and behaviour within a specific context (Guest et al., 2012). Thematic analysis of teacher post-intervention interviews was used to understand teacher's views and reflections of the one week teacher training and two week intervention. The interview addressed three parts of the intervention: teacher training and support, intervention curriculum and materials, and student improvement. The teachers reported an overall positive experience in the intervention. The following section will breakdown the teacher's reflection of the three parts of the intervention. where they developed professionally and their students were eagerly engaged with class content.

4.3.1 Teacher training and support

This theme details teachers' views on the teacher training content and the level of support teachers felt before and during the intervention. Overall, teachers found the intervention helped them develop professionally where they were introduced new pedagogy to teaching Chinese. However, they found that linguistic concepts were hard to fully grasp and were not confident in instructing the content to their students. The teachers also reflected that there was a noticeable learning curve when transitioning to more novel classroom interactive activities (e.g small group work etc.). Sub-themes that emerged within this topic are presented in Table 6.

Table 6.

Summary of Sub-themes for Teacher Training and Support

Sub-themes	Summary
Quality of Professional Development Curricular	Pros
	Engaging teacher training content
	Novel and creative teaching methods and pedagogy for Chinese teaching
	Informative content for Chinese instruction
	Cons
	Difficult to translate content learnt in teacher training to student instruction
	Concepts of Chinese linguistic word structures were hard to understand
Teacher self-efficacy	Pros
	Felt proud and accomplished when seeing their students understand difficult concepts and expand on them
	Felt motivated to implement the training well and wanted to learn about innovative teaching strategies
	Cons
	Felt not knowledgeable enough in Chinese linguistic competencies (中文素养) to teach the intervention to its full extent
Traditional verses Novel teaching strategies	Pros
	Learn new teaching strategies that can be applied elsewhere
	Cons
	Needed more time to get acclimated to different teaching style
	Not used to facilitating small group work and student oral presentation, which affected teaching and student engagement

4.3.2 Intervention Curriculum and Material

This theme details teachers' attitudes towards the lesson plans and materials used in the intervention (children's book, word map, etc.). A summary of the sub-themes that emerged from conversations regarding the Teacher Training and Support is detailed in Table 7.

Table 7.

Summary of Sub-themes for Teachers' views on Intervention Curriculum and Material

Subcategories	Summary
Applicability	Pros Clear lesson plans that were easily applied in the classroom Accompanying lesson slides provided were engaging and helpful for students to visualized vocabulary concepts Cons The intervention felt dethatched from the children's school curriculum
Timeline	Cons Two-weeks was not enough time to get students' acclimated to the course structure There was much content to cover and not enough time to teach it in depth
Engagement in Material	Pros Students were very intrigued and interested in the story book and would take it out to read even after class The word map was an engaging way to help students remember word structures and extend knowledge

The participants found the curriculum and material engaging and effective in supporting the understanding of challenging concepts. However, both teachers expressed that the short two week timeframe limited their instruction and the curriculum felt rushed under the backdrop of the students' upcoming final exam. The teachers stated that this timing influenced the outcome of the intervention. A quote from the interview with the two teachers highlights this struggle:

> *During that time, we were also trying to revise for the students' final exam for the end of the school year. I'm quite an impatient person. I wanted to have it both: I wanted to help children revise for the final exam, I also wanted to teach the "Word Builders" well. I had to take time from my other classes that was not planned for the class series (the intervention). (Intervention Teacher 1, July 14th, 2021)*
>
> *15 minutes was not long enough to do what we wanted to do for each session, especially if you want to include small group work and classroom discussions. This class is different than to when I'm just teaching (the usual school curriculum). I needed more time. (Intervention Teacher 2, July 12th , 2021)*

4.3.3 Student engagement and comprehension

This theme represents teachers' perception of student's level of engagement and comprehension. Table 8 presents sub-themes occurring during discussions of student engagement and comprehension.

Table 8.

Summary of Sub-themes for Student engagement and Comprehension

Subcategories	Summary
Classroom engagement	Pros Classroom engagement was high during shared book reading, small group work and oral presentations Students that comprehended the intervention content better were able to support and help their peers in understanding Students that usually did not participate in classroom activities were willing to engage and proactively ask questions Cons Students became frustrated during later weeks because of the difficulty of more abstract vocabulary structures
low verses high achieving students	Pros Students that usually struggle in Chinese class were able to participate more because of the intervention's focus on expressive language. Students that usually struggle were able to demonstrate some understanding of vocabulary words Students with better foundational knowledge in Chinese were able to not only comprehend concepts better but also extend such knowledge to novel words Cons Students that usually struggle in Chinese class also struggled in understanding vocabulary depth to the same extent as students with better foundational Chinese knowledge.

Teachers described that children were, in most parts, engaged with the curriculum. Specifically, teachers found that the class activities allowed low achieving students to also be involved. However, teachers also observed that for many compound word structure concepts, high achieving students would be the only group that was able to fully comprehend the material. Quotes from the interview is given below to illustrate this description.

> *For example, before this (intervention),a student in my class [name redacted], usually doesn't like to study. His Chinese school marks were also not the best. However, after one of the (intervention) sessions, he actually came up to me to ask questions! This surprised me. (Intervention Teacher 1, July 14th, 2021)*
>
> *Everyone had their chance on stage, even the ones that usually score 10 to 20 points on their (Chinese) tests in school would be involved. They did well in expressing their thoughts and ideas on the concepts and topics, even though it wasn't always right. Sometimes, the children didn't know how to write down words, but if you want them to express what they want to write, they are pretty quick and flexible. (Intervention Teacher 2, July 12th , 2021)*

The teacher mentioned how though she didn't know how much this student comprehended concepts taught in class at the time, she was encouraged knowing that this student was proactive in wanting to learn.

CHAPTER 5 Discussions & Conclusions

The present intervention study aimed to explore the outcome of targeted morphological training on vocabulary knowledge. Specifically, the researcher investigated if a two-week compound lexical awareness training was feasible in increasing the vocabulary depth of third-grade children in rural China. The study looked at three different aspects of intervention effect: 1) whether there was an overall difference in children's performance in morphological awareness and vocabulary knowledge assessments; 2) whether morphological principles of decoding target vocabulary taught in the intervention would transfer to novel words; 3) if there was a relationship between pre-test scores and post-test performance. Additionally, the study attempted to understand the intervention teachers' perspectives on the intervention through qualitative analysis of interviews with the teachers. The study found an overall positive effect of the intervention on children's morphological awareness and vocabulary knowledge performance. The teachers also reflected positive experiences of the intervention. The present chapter will now discuss the study's findings by addressing each research question presented in previous chapters.

5.1 Overall Improvement

One aim of the study was to inspect whether there was an overall improvement in morphological awareness and vocabulary knowledge before and after the intervention. Findings confirm that a targeted training in Chinese compound lexical awareness increases children's compound lexical awareness and vocabulary depth as statistical tests revealed a significant difference between pre- and post-test scores in the Word Definition Task and Lexical Compounding Task. This finding is consistent with the current literature that has shown a causal relationship between morphological awareness and vocabulary knowledge (Tong, et al., 2017; Wu et al., 2009). The study complements other morphological awareness intervention studies in the literature that look at sub-lexical awareness training and MA interventions for young children (Carlisle, 2010; Wu et al., 2009). The current study provides evidence for successful morphological awareness training in older children and lexical-level morphological training for literacy growth.

Inspecting the sub-tasks of the assessments, the researcher found that students did better in the Morphological construction sub-task in comparison to the Morphological production sub-task. This result was consistent with research discussed previously where with assessments of similar structures, children scored better in the construction task than the production task because

children did not have an analogous example to base their responses on in the construction task (Liu et al., 2013; Liu & McBride-Chang, 2010). The difference in the performance of these two tests shows how the structure of question types of assessments greatly influences the difficulty level and construct validity of morphological awareness tests.

5.2 Transfer Effects

The study was also concerned with inspecting the transfer effect of the intervention and looked at if knowledge on subordinate compound structures of taught words, transfer to other novel subordinate structures that either had a shared morpheme or had completely different morphemes with the target words. An ANOVA test showed no difference between the improvement of scores of taught, near transfer, and far transfer words. Thus, the study suggests a strong transfer effect for the intervention towards both subordinate compound words that shared a morpheme with the target word and ones that were comprised of different morphemes.

The transfer effect provides insight into the extent to how lexical compound awareness contributes to vocabulary depth (Ku & Anderson, 2003). The observed transfer effect between taught and near transfer may be due to how the morphemes in Chinese words are highly reproductive by nature where one morpheme may be reused in multiple words of the same compound lexical structure. By learning the lexical structure of a word, children may easily infer the meaning of another word that shares the same morpheme. The degree of transfer effects of the intervention may also be related to "morphological problem solving" activities (e.g word maps) embedded in the intervention that trained students to recognise novel words that shared the same morpheme. Thus, when encountering words in the near transfer category, children were able to adopt "morphological problem solving" strategies utilised in the sessions and decode the meaning of novel words (Anglin et al., 1993, p5). This phenomenon of children "teaching themselves" the meaning of novel vocabulary or morphemes is reflected in the intervention of Wu and colleagues (2009, p49) that trained young children's morphological awareness on the sub-lexical level. Intervention teachers in Wu and colleagues (2009) expressed that by the end of the intervention children were able to infer the meaning of novel characters based on knowledge of compound characters. The current study extended the findings of Wu and colleagues (2009) by inspecting lexical-level awareness in older children. The study provided evidence that knowledge in lexical structures gained from targeted morphological training on taught words can transfer towards other words of the same morpheme and lexical structure. Another possible cause

may be that children were more familiar with the assessment and the rate of improvement was an outcome of that familiarity rather than the intervention. Future research may look into providing pre- and post-tests that can match in equivalence to minimise the effect of test familiarity.

5.3 Effects of initial scores

A third inquiry the study addressed was how initial performance in the test related to the level of improvement after the intervention. Results of a Pearson's correlation found that there is a negative correlation between pre-test scores and improvement rate, meaning that the lower children scored in the pre-test, the greater the improvement post-intervention. An initial concern of the researcher was that the intervention may produce a Matthew effect in its outcomes, or in other words, children who struggle with vocabulary initially would improve less compared to those with greater vocabulary knowledge. This phenomenon is due to a self-perpetuating mechanism described by scholars such as Penno and colleagues (2002) where students with more extensive and complex vocabularies can leverage their vocabulary capability to learn and further develop new and deeper vocabulary. Because of accumulated positive experiences with vocabulary learning, these capable students are more motivated to seek literacy learning experiences, thereby accelerating their literacy development further (Coyne et al., 2019; Penno et al., 2002).

A Matthew effect for interventions would be concerning because oftentimes the aim for interventions is to support the learning and development of children who struggle most in school. However, the current study found the opposite effect, where children who initially found the tests most challenging improved more. This finding contradicted previous research that found morphological training for students with poor literacy skills was not useful (Adams, 1990). In the current study, multiple strategies of vocabulary learning and morphological training were adopted, including small group discussion, peer reading groups, morphological problem solving, and explicit vocabulary instruction to support children's understanding of lexical compounding awareness. Thus, current findings aligned with more recent scholarship that saw morphological training benefiting struggling learners more than those who did not struggle with literacy when the training incorporated other literacy learning strategies (Bowers et al., 2010). However, this hypothesis must be contextualised within the short timeframe this intervention has taken place, as the self-perpetuating mechanism described by Penno and colleges (2002) happens over a

longer duration. However, this study was not concerned with testing for the delayed effect of the intervention. It is possible that with a longer intervention that included delayed testing that there may be a washout effect. There might also be a strengthening of the effect as the learning is consolidated and metalinguistic skills gained from the intervention continue to grow.

The improvement of the struggling learners may also be explained by how the intervention specifically targeted morphological awareness, a literacy skill when low is often associated with dyslexia in Chinese and poor vocabulary acquisition, word reading, and reading comprehension (Shu et al., 2006; Tong, et al., 2017a). Shu and colleagues (2006) found that morphological awareness was consistently the strongest predictor of variability in literacy and related skills such as reading comprehension, phonological awareness and rapid naming. By targeting morphological awareness, the intervention may be supporting a core literacy skill lacking in poor literacy learners.

This outcome diverged from teachers' impression of the level of comprehension between struggling learners and high-achieving learners. During teacher interviews, teachers expressed that the content seemed very challenging to the struggling learners and that there was more instructional scaffolding needed for struggling learners to comprehend what was taught. The teachers reflected that "good students" in the class would understand the concepts taught very quickly and would oftentimes help explain challenging concepts to their peers. This divergent outcome between assessment results and teacher interviews may be a result of "good students" feeling more uncomfortable with giving answers to questions they are unsure of and skipping to reply rather than attempting to guess answers.

Interestingly, a regression analysis for both tests observed that certain students, particularly high-scoring students scored less in the post-test compared to the pre-test. Specifically, seven students scored worse in the Lexical Compounding Task and four students scored worse in the Word Definition Task. This may be caused by children skipping test items rather than attempting to guess question answers. The researcher noticed that in post-tests, more children decided to skip questions that they were unsure of. By converging quantitative data from post-intervention Word Definition Task with qualitative data acquired from teacher interviews, the researcher found that this change in attitude converged with reflections from teacher interviews. Teachers stated that while "good students" were producing deeper definitions of targeted words and were able to extend vocabulary structure knowledge to novel words during

class discussions, they were less willing to guess answers during class sessions if they were not certain of the answer and were more apprehensive in answering open-ended questions. Thus, the test may not fully represent the comprehension and improvement of students that initially scored well in the test.

5.4 Teachers' experiences

Finally, the study was concerned with teachers' attitudes and experiences within the intervention. As this was a teacher-led intervention, teachers' experiences became instrumental to the effectiveness of implementation and future improvement of interventions alike. Teachers reflected an overall positive experience in which they gained evidence-based teaching strategies that they will likely incorporate in future teaching. The teachers did reflect, however, feelings of stress and uncertainty due to the tight timelines the intervention was under and the more challenging linguistic concepts introduced.

In terms of positive experiences, teachers reported that the training workshops and weekly refreshers helped get accustomed to new pedogeological concepts and instructional methods of morphological awareness and vocabulary acquisition. Teachers also implied that they were intrinsically motivated to do well because of the level of involvement and engagement they felt during professional development. The teachers expressed that the class was able to engage effectively in the class material and lesson plans. The teachers were particularly encouraged by the increase in engagement from students that usually shy away from classroom discussions and activities.

The positive feedback from the teachers reflects characteristics of successful teacher professional development characteristics in terms of providing interactive teacher workshops that addressed classroom applications and booster sessions throughout the intervention.

However, teachers mentioned multiple times during the interview that the intervention was too short and they did not have adequate time to be acclimated to the teaching rhythm and style of the intervention. The teachers described how the first week of the intervention was particularly challenging for them as both the teachers and the students were adjusting to a new structure of teaching that included more student-led and inquiry-based teaching rather than passive learning strategies where the teacher outputs information to the students. The teachers

expressed that a more integrated curriculum that embedded morphological awareness into everyday Chinese class would be less disruptive to the flow of the school's normal curriculum.

This feedback from the teachers was anticipated as previous research suggests that teacher professional development should develop a rhythm of activities and check-ins. Yet within a short-term teacher training workshop that aimed to implement a condensed intervention, this rhythm of teacher training is difficult to develop. It should be noted that the original design for the intervention was a five-week intervention that spread session plans over a longer timeframe. However, the intervention was eventually shortened due to the effects of COVID-19 (e.g school closure, travel restrictions, etc.). Future research may look into effective teacher training strategies for short-term or teacher professional development that were focused on training a specific skill.

5.5 Limitations

A major limitation of the paper relates to recruitment and fidelity of implementation while conducting research in schools during unprecedented times. Because the researcher conducted the fieldwork entirely remotely, it was especially challenging to recruit sufficient participants to design an intervention that had between-group comparisons. This relates to research ethics while conducting research in low-resource communities. School administrators of the participating site expressed in informal conversations that assessing children and taking up classroom time without providing the children with an intervention would not be welcomed. Future research may consider designing a similar intervention that includes a delayed control group or an active control group to control for variables such as student's growth in Chinese over time due to daily Chinese instruction, familiarity of tests, teachers' increased motivation, etc. While because of this design, the effect of the intervention may be overstated by statistical tests, other findings such as transfer effects mentioned previously provide evidence for the effectiveness of the intervention.

Because the research was remote, implementation fidelity was controlled mostly through teacher-self report. Other fidelity control strategies such as in-class observations would supplement well teachers' self-report of classroom engagement and implementation quality. Teachers reflected that they would at times revert to old teaching habits because they felt that there was not enough time to engage with students in discussion and exploration. However, past

literature has found that literacy interventions in low and middle-income communities still see significant effects though there exist issues of implementation fidelity such as teachers reverting to past instructional methods (Kim et al., 2020).

Since the assessments were researcher-developed, there was issues regarding the reliability of the tests. Though pilot tests were conducted and extensive literature on test prompt formats, theory in morphology and vocabulary knowledge and development was reviewed, assessment reliability was challenging to ensure. This limitation illuminates the need for the development of morphological awareness tests that have been generalised to different linguistic settings.

A final consideration for limitations is the sampling strategy of the study. Although the research site was considered a typical rural central primary school in terms of size and demographics, the sampling was not randomised. However, research methodology was guided by a naturalistic approach and considered the needs of the community. As such, the intervention was designed in a way that incorporated the experiences of the participants and provided contextualised instructional material and teaching strategies, characteristics that are often lacking in literacy classroom practices of low-resource communities.

5.6 Implications and Future Directions

The current study provides an exploration toward the feasibility of short-term teacher-led vocabulary interventions that target compound lexical awareness in late primary school. The pilot intervention can provide the structure for a future efficacy trial. The process documentation in the current study offers information for future intervention implementation to ensure program fidelity.

This study attempts to embed qualitative analysis within a larger intervention framework and aims to not only consider producing generalisable knowledge but also how research outcomes may directly benefit the researched community and include the community in the decision-making process.

The research also has implications for strategies for vocabulary instruction in that incorporating targeted morphological training in-class curriculum may improve children's vocabulary knowledge growth. Since the study also identified the contribution of a targeted lexical compounding training for struggling literacy learners, interventions for academically low-

achieving students in literacy may help narrow the gap between the high and the low achieving students.

Conclusions

The present findings appear to confirm that targeted compound lexical training in the Chinese language in third grade has significant effects on improving compound lexical awareness and vocabulary depth. This knowledge may not only have a transfer effect to novel words, it may also benefit children that are struggling in literacy learning most. The study demonstrates the importance of ecologically valid intervention research through a mixed methods approach that is designed with the participating community in mind. Although this research provides an optimistic view for vocabulary interventions in Chinese, there is much research that needs to be done in terms of reliable measurements for morphological awareness that would provide opportunities for early intervention and contribute to standardising Chinese morphological awareness measurement in the field.

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Appendices

Appendix A: CUREC Approval Email

Sandra Mathers <sandra.mathers@education.ox.ac.uk>
Wed 5/19/2021 10:03 AM
To: [redacted]
Cc: Student CUREC <student.curec@education.ox.ac.uk>

Dear [redacted]

Word Builders: a teacher-led intervention programme - approval reference CIA-21-241

The above application has been considered on behalf of the Departmental Research Ethics Committee (DREC) in accordance with the procedures laid down by the University for ethical approval of all research involving human participants. I am pleased to inform you that, on the basis of the information provided to DREC, the proposed research has been judged as meeting appropriate ethical standards, and accordingly, approval has been granted.

Please continue to follow all current guidance issued by CUREC during the pandemic, notably COVID-19: CUREC guidance on research involving human participants, and on internet-based research:
https://researchsupport.admin.ox.ac.uk/governance/ethics/coronavirus

If relevant please also check the CUREC website for their best practice research guides:
https://researchsupport.admin.ox.ac.uk/governance/ethics/resources/bpg

Should there be any subsequent changes to the project which raise ethical issues not covered in the original application you should submit details to research.office@education.ox.ac.uk for consideration.

Good luck with your research study

With kind regards,

Dr. Sandra Mathers
Department of Education
University of Oxford

Dr. Sandra Mathers
Senior Researcher
Department of Education
University of Oxford

Appendix B: DPA and DPIA Approval Email and Forms

Appendix B1: DPA Approval Email Form

Lisa Holmes <lisa.holmes@education.ox.ac.uk>
Tue 7/6/2021 3:03 PM
[redacted]

1 attachments (62 KB)
[redacted]

Dear [redacted]

Thank you for following up, and providing me with your updated DPA form. I have now reviewed and approved – with a note on the review section that this is an updated version of your original form.

Ellie, please note that this is a subsequent approval for Naijing (original approval granted on 14 May), so please could you add to the log as an update, rather than as a new approval. Many thanks.

All the best,
Lisa.

Dr Lisa Holmes
Associate Professor
Rees Centre, Dept of Education
University of Oxford
15 Norham Gardens
Oxford, OX2 6PY
Tel: 01865 274056
Twitter: @LisaHolmes_Rees
http://reescentre.education.ox.ac.uk

Rees Centre | DEPARTMENT OF EDUCATION | UNIVERSITY OF OXFORD

[redacted]
Monday, 28 June 2021 at 20:25
To: Lisa Holmes <lisa.holmes@education.ox.ac.uk>

Appendix B2: DPA Form

Screening assessment outcomes and reasons:
Set out the outcomes and reasons identified in your screening assessment here to explain why you have concluded a DPA is necessary
My research is concluded to be a low risk research based on DPIA screening outcomes. The data collection methods have been evaluated to be low risk for data breach. The nature of my data also does not belong to any category of special/sensitive data.

Stage 1: Necessity and Proportionality Assessment of Proposed Processing of Personal Data

What is your **lawful basis** for processing? What additional **condition** are you relying on for processing special category data? **Transparency:** When you collect the data, will you be giving individuals the following information: a. The purposes for which their personal data will be processed? b. The people or organisations their personal data will be shared with? c. The lawful basis for processing their personal data? d. Any international transfers of their personal data e. When their personal data will be erased? f. Their rights under GDPR? **Accuracy:** Are individuals able to update their personal details in the event of any changes?	The student researcher will strictly adhere to the GDPR guidance for the processing of personal data. The study does not collect special category data. Public interest task **Transparency:** All the information outlined will be provided to the participants. Letters and information sheets to the head teacher, intervention teachers, and parents will state that the research strictly adheres to the research ethics principles of the University and hence follow GDPR. **Accuracy:** The only personal data collected would be the child's age, gender, and school marks, which are provided by the student at the beginning of the assessment. There is a low likelihood that this data would need to be altered. However, participants are free to adjust and change their responses during the data collection period. The

Data minimisation: a. Is the personal data to be collected the minimum necessary to achieve your purpose(s)? b. Will access to the personal data be restricted to those with a strict need to know? c. How will access be controlled? d. Is there any scope to anonymise or pseudonymise the data **Retention:** a. Is there a documented retention schedule? b. Is there a clear reason for the length of time personal data will be kept? c. Is the reason documented? d. Is there a procedure for implementation of the retention schedule? e. Is there a procedure in place for monitoring the implementation of the retention schedule? **Security:** a. Will personal data be collected, transmitted and stored securely? b. Is the level of security to be provided appropriate to the risks presented by the processing? c. Will arrangements be put in place for the secure disposal and/or destruction of data when it is no longer required? **Data processors:** a. Will a third party be used to process the personal data on behalf of the University? b. What processing will the processor carry out? c. Is there an agreement in place with the third party? d. Does the agreement include all the provisions required under the GDPR? **Data sharing:** a. Are decisions about how the personal data will be used being taken jointly with another organisation? b. Is the personal data to be shared with that other organisation? c. Is there an agreement with the other organisation covering	participants will be notified the time period allowed for data revision. **Data minimisation:** Minimal amount of basic descriptive data will be collected (children's age, gender, and school marks). Data will only be seen by myself and my supervisor. All child data will be pseudonymised using unique identifier codes. **Retention, Security** The student researcher has created a streamlined process of data collection and digitalisation detailed below: Opt-out forms & consent records: Paper consent forms will be saved by the classroom teachers and digital opt-out forms will be stored safely and securely on an encrypted online file with the University's network (Nexus365 OneDrive). The paper consent forms will be shredded immediately after the research has been completed. Student's school marks: student's scores will be transferred to an excel sheet where scores will be matched with the student's unique identifier. The original excel sheet with students' names will be destroyed. Pre/Post test data from task results: Pre-Post test data will be stored in secure and encrypted online drive with the University's network (Nexus365 OneDrive). Audio recordings & transcripts: Audio recordings will be stored as password-protected files on an encrypted online file with the University's network (Nexus365 OneDrive). They will then be deleted from the original recording device. The transcription will be stored as a Word file on encrypted computers within the University network. The audio recording held by the researchers will then be deleted. **Data processing:** The study does not allow access to personal data to any third parties. The student researcher and her supervisor will be the only ones with access to the data. **Data sharing:**

respective roles & responsibilities including request and complaints handling? **International transfers:** a. Will personal data be transferred outside the EEA? b. If so, will the transfer be to a country approved by the EU? c. If not, will appropriate safeguards be in place e.g. model clauses/Privacy Shield	The personal data will not be shared with another organisation. **International transfers:** The personal data will be collected in China and will be stored in the University server. Files will be transferred using the University's email system and file transfer system.

Stage 2: Risks Identification and Assessment Matrices

		SEVERITY OF IMPACT		
		Minimal	Significant	Severe
LIKELIHOOD OF HARM	Remote	LOW	LOW	LOW
	Possible	LOW	MEDIUM	HIGH
	Probable	LOW	HIGH	HIGH

Risks of Processing Matrix

Impact on Individuals **Will the processing lead to individuals suffering…**	**Likelihood of Harm** **Remote** **Possible** **Probable**	**Severity of Impact** **Minimal** **Significant,** **Severe**	**Overall risk** **Low,** **Medium** **High**	**Reasons**
Inability to exercise their privacy rights ie: • To be given information about processing • To access their personal data • To request correction • To request erasure • To object to personal data being processed for marketing purposes • To object to processing where the lawful basis is legitimate interests • To restrict processing • To request transfer to another party • Inability to request decisions are made by a person and not by automated processing	**Remote**	**Minimal**	**Low**	Participants will be informed about their privacy rights through information letters and verbally before the study takes place. The nature of the data will be audio recordings, written responses to multiple choice questions, school marks and basic information about the student including the student's age and gender and school marks. This data is not of a sensitive nature. There is minimal risk for identity theft, fraud, financial loss, reputation, physical harm, emotional harm, economic or social disadvantage. As the identifier sheet will be destroyed once the thesis is submitted, there is no risk of reidentification of pseudonymised data.
Inability to access services	**Remote**	**Minimal**	**Low**	
Inability to access opportunities	**Remote**	**Minimal**	**Low**	
Loss of control over personal data	**Remote**	**Minimal**	**Low**	
Discrimination	**Remote**	**Minimal**	**Low**	
Identity theft	**Remote**	**Minimal**	**Low**	

Fraud	**Remote**	**Minimal**	**Low**	The only personal data collected would be the child's age, gender, and school marks, which does not impact the participant's ability to access personal data.
Financial loss	**Remote**	**Minimal**	**Low**	
Reputational damage	**Remote**	**Minimal**	**Low**	
Physical harm	**Remote**	**Minimal**	**Low**	
Emotional harm	**Remote**	**Minimal**	**Low**	
Loss of confidentiality	**Remote**	**Minimal**	**Low**	
Reidentification of pseudonymised data	**Remote**	**Minimal**	**Low**	
Any other significant economic disadvantage	**Remote**	**Minimal**	**Low**	
Any other significant social disadvantage	**Remote**	**Minimal**	**Low**	
Inability to access personal data because IT systems used for processing are unavailable	**Remote**	**Minimal**	**Low**	
Inability to access personal data in a timely manner due to inability of the University or a third party to restore access to systems in a timely manner	**Remote**	**Minimal**	**Low**	

Security Risk Matrix

Source of Risk to Individuals A breach of security leading to individuals suffering…..	**Likelihood of Harm** **Remote** **Possible** **Probable**	**Severity of Impact** **Minimal** **Significant,** **Severe**	**Overall risk** **Low,** **Medium** **High**	**Reasons and Measures to be Taken**
loss of personal data examples: • Insecure electronic devices • Unencrypted memory sticks • Paper copies removed from secure work environment • IT system	**Remote**	**Minimal**	**Low**	All personal data will only be stored in password protected files on the student researcher's computer that is also password protected.
destruction of personal data	**Remote**	**Minimal**	**Low**	All non-identifiable data will be stored for at least 3 years after final publication of this study. The data will be shared with the student researcher's supervisor.
alteration of personal data	**Remote**	**Minimal**	**Low**	The only personal data collected would be the child's age, gender, and school marks, which are provided by the student at the beginning of the assessment. Personal data would not be altered
Unauthorised disclosure of personal data examples: • Insecure paper waste disposal	**Remote**	**Minimal**	**Low**	The student researcher has created a streamlined process of data collection and digitalisation that ensures the safe collection, transfer and storage of participant data (detailed in section 1 above).

• Insecure hardware disposal • Use of insecure email accounts Phishing by email, telephone or face to face				

Unauthorised access to personal data examples: • · Inadequate doors and locks • · Inadequate supervision of visitors • · Inadequate IT system security	Remote	Minimal	Low
Inability to access personal data because IT systems used for processing are unavailable	Remote	Minimal	Low

Data Protection Principles Risks Matrix

Source of Risk to Individuals Will individuals suffer harm because….	**Likelihood of Harm** **Remote Possible Probable**	**Severity of Impact** **Minimal Significant, Severe**	**Overall risk** **Low, Medium High**	**Reasons and Measures to be Taken**
Personal data will not be obtained direct from individuals & informing them of processing is impossible to achieve or will involve disproportionate effort	**Remote**	**Minimal**	**Low**	Personal data will be collected from the child participants . The researcher will provide both written and verbal notice of the

				data collection process
The purpose of processing is unclear	**Remote**	**Minimal**	**Low**	In the unlikely case that there is a change to the data collection process due to unforeseen circumstances, the researcher will file an amendment to CUREC to be granted approval.
The purpose changes over time	**Remote**	**Minimal**	**Low**	
A new purpose arises	**Remote**	**Minimal**	**Low**	
Inadequate personal data is collected for the purpose	**Remote**	**Minimal**	**Lows**	Only minimal descriptive personal data will be collected.
Irrelevant personal data is collected	**Remote**	**Minimal**	**Low**	
More personal data is collected than necessary	**Remote**	**Minimal**	**Low**	
The personal data held is not accurate	**Remote**	**Minimal**	**Low**	The personal data will be only collected through children themselves
The personal data is collected from unclear sources	**Remote**	**Minimal**	**Low**	
The integrity of the personal data is unclear	**Remote**	**Minimal**	**Low**	
The personal data is kept for longer than needed	**Remote**	**Minimal**	**Low**	All non-identifiable data will be stored for at least 3 years after final publication of this study.

	XXXXXX

Carried out by:	
Role:	MSc CDE student
Date:	14/05/2021
Approved by:	Lisa Holmes
Role:	Deputy Director of Research
Date:	14.05.2021
First review Date:	
Measures to be incorporated into project plan	By: Role: By date:

Appendix C – Invitation Letters and Consent Forms

Appendix C.1 – Letter and for the Head teacher (CN/EN)

UNIVERSITY OF OXFORD
DEPARTMENT OF EDUCATION
15 Norham Gardens, Oxford, OX2 6PY
Tel: +44 (0) 1865 274024 Fax: +44 (0)1865 274027
Email: general.enquiries@education.ox.ac.uk
[redacted]

[redacted]

Project title: **"Word Builders": a teacher-led vocabulary intervention program**

Ethics Approval Reference: Pending

Dear Head Teacher Wang,

I am writing to enquire about conducting some research in your school this school term (2021 2nd term). I am a XXXXXX at the University of Oxford, supervised by XXXXXXXX. In my research study, **"Word Builders" a teacher-lead third grade vocabulary intervention program**. This graduate research project aims to use training in vocabulary structures and reciprocal teaching pedagogy to improve students' vocabulary knowledge.

Through this lesson series, children will learn how and why words are "built" with certain structures. For children that are struggling in Chinese literacy, character reading often becomes a bottle-neck for later literacy learning. Shaky reading comprehension also may introduce hurdles for young readers in third grade. Because vocabulary knowledge can support children's character identification and reading comprehension, improving children's vocabulary knowledge is crucial for children's Chinese literacy at this age.

The "Word Builders" Chinese vocabulary training lesson series will provide teacher training for teachers to instruct the lesson series. "Word Builders" will also focus on vocabulary structure knowledge and reciprocal teaching to increase children's vocabulary knowledge over the span of 3 to 5 weeks (15 to 30 min/day).

University of Oxford has strict ethical procedures on conducting ethical research with teachers and students, consistent with current British Educational Research Association guidelines. Before beginning the research, I would inform parents/guardians about the research and offer the students and parents/guardians the opportunity to refuse to participate. Throughout the research, students and parents/guardians will be able to refuse to participate at any time.

All participants, including students, teachers and the school, would be made anonymous in all research reports. The data collected would be kept strictly confidential, available only to my supervisor and myself. All recordings and paper work data would be destroyed at the end of the research period, and kept in a secured online location until then.

If your school would like to take part in the study, or you need more information about what is involved, please contact me.

Thank you for your time and attention. I look forward to hearing from you.

Yours Sincerely,

XXXXXX

UNIVERSITY OF OXFORD
DEPARTMENT OF EDUCATION
15 Norham Gardens, Oxford, OX2 6PY
Tel: +44 (0) 1865 274024 Fax: +44 (0)1865 274027
Email: general.enquiries@education.ox.ac.uk
[redacted]

[redacted]

研究项目： “小小词汇建造师”三年级语文词汇训练

道德批准参考: Pending

尊敬的王校长，

我是，目前就读于牛津大学，我的研究生导师为 XXXXXXXX 博士。我诚挚地向您请示有关于将在贵校 2021 年度下学期所要展开的研究项目。作为本人的研究生毕业实验，**“小小词汇建造师”三年级语文词汇训练**旨在通过锻炼词汇结构和交互式教学法来提升学生们的词汇知识。

在接受这一系列实验课程后，贵校学生们将会学习词语是如何被“建造”出来的。词汇量和理解深度很大程度上影响着孩子的识字量和阅读理解，而认字和词汇对于基础较弱的学生来说是一个瓶颈，同时，阅读理解又是三年级学生的一个语文教学难点。所以在这个阶段增加学生的词汇量和词汇理解深度对于语文学习至关重要。.

对于贵校所参与到本实验课程的老师们，“小小词汇建筑师”会涉及到一些有关于展开相关工作的指导培训，同时这项课程将在为期 3-5 周，每日 15-30 分钟的训练中通过针对词汇结构知识的交互式教学法来提高孩子们的词汇知识。

为了保护参与实验的群体，牛津大学对于任何涉及到学生与教师的实验研究有着严格的实验道德伦理要求，遵从目前英国教育研究协会的准则。在这项研究开始前，我会告知学生极其家长和监护人相关的实验流程，并尊重学生和家长们自愿参加的权力，同时所有决定参加实验的学生及其家长或监护人都保有在任意实验阶段选择退出的权力。

包括学生、老师、家长、及学校在内的实验参与者都将收到匿名保护，其身份不会在研究报告中出现。所收集的实验数据也将被严格保密，仅用于以研究为目，限于本研究员及研究导师的查看与分析，任何其他用途只能在全体参与者的一致答允后进行，实验中所涉及到的录像也会在实验最后阶段被销毁。

如果贵校有意应邀参加本实验，或有关任何疑问需要垂询，请通过邮箱：XXXXXXXX 联系我，或联系本人研究导师 XXXXXXXX 博士：XXXXXXXX。由衷感谢您宝贵的时间。

期待回执

Appendix C.2 – Letter for the Intervention teacher (CN/EN)

UNIVERSITY OF OXFORD
DEPARTMENT OF EDUCATION
15 Norham Gardens, Oxford, OX2 6PY
Tel: +44 (0) 1865 274024 Fax: +44 (0)1865 274027
Email: general.enquiries@education.ox.ac.uk
[redacted]

[redacted]

Project title: **"Word Builders": a teacher-led vocabulary intervention program**

Ethics Approval Reference: Pending

Dear Teacher [insert name]

I am a XXXXXX at the University of Oxford, supervised by XXXXXXXX. In my research study, **"Word Builders" a teacher-lead third grade vocabulary intervention program**. This graduate research project aims to use training in vocabulary structures and reciprocal teaching pedagogy to improve students' vocabulary.

Through this lesson series, children will learn how and why words are "built" with certain structures. The "Word Builders" Chinese vocabulary training lesson series will provide teacher training for teachers to instruct the lesson series. "Word Builders" will also focus on vocabulary structure knowledge and reciprocal teaching to increase children's vocabulary knowledge over the span of 3 to 5 weeks (15 to 30 min/day).

I would like to invite you to take part in an online professional development (PD) program where you will learn about vocabulary structures, as well as how teach them to students through planned classroom activities. The PD program that will take place before the "word builders" classes for 3 hours every weekend for two weeks, along with weekly reflection sessions of no more than 45 minutes, will allow you to implement the intervention program. The PD program and weekly reflection sessions will be held when is most convenient for you and the school. In addition to reflection sessions, you will also have the opportunity to give feedback at the end of the program by way of a short interview.

University of Oxford has strict ethical procedures on conducting ethical research with teachers and students, consistent with current British Educational Research Association guidelines. Before beginning the research, I would inform parents/guardians about the research and offer the students and parents/guardians the opportunity to refuse to participate. Throughout the research, students and parents/guardians will be able to refuse to participate at any time.

All participants, including students, teachers and the school, would be made anonymous in all research reports. The data collected would be kept strictly confidential, available only to my supervisor and myself and not used other than specified without the further consent of all involved being obtained. All recordings would be destroyed at the end of the research period, and kept in locked condition until then.

If your school would like to take part in the study, or you need more information about what is involved, please contact me at XXXXXXXX, or my supervisor XXXXXXXX at XXXXXXXX. Thank you for your time and attention. I look forward to hearing from you.

Yours sincerely,

XXXXXX

UNIVERSITY OF OXFORD
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[redacted]

[redacted]

研究项目： “小小词汇建造师”三年级语文词汇训练

道德批准参考: Pending

尊敬的「」老师，

我是，目前就读于牛津大学，我的研究生导师为XXXXXXXX博士。我诚挚地向您请示有关于将在贵校下一学年度所要展开的研究项目。作为本人的研究生毕业实验，**“小小词汇建造师”三年级语文词汇训练**旨在通过锻炼词汇结构和交互式教学法来提升学生们的词汇知识。

在接受这一系列实验课程后，贵校学生们将会学习词语是如何被“建造”出来的。词汇量和理解深度很大程度上影响着孩子的识字量和阅读理解，而认字和词汇对于基础较弱的学生来说是一个瓶颈，同时，阅读理解又是三年级学生的一个语文教学难点。所以在这个阶段增加学生的词汇量和词汇理解深度对于语文学习至关重要。

如果您愿意参加本实验，我将有幸邀请您参与一项在线教师培训课程，在此课程中您将会接受有关词汇结构和项目课程课堂应用的培训。此项目教师培训将会在“小小词汇建造师”开展前的前2周周末，每周末进行3个小时的训练，同时您将有机会有与研究人员一周一次不超45分钟的课程进展复盘会议。教师培训均会参照您的日程便利，此外整个课程以及模拟课堂结束后您将有机会以接受采访的形式提供相关供建议和反馈。

为了保护参与实验的群体，牛津大学对于任何涉及到学生与教师的实验研究有着严格的实验道德伦理要求，遵从目前英国教育研究协会的准则。在这项研究开始前，我会告知学生极其家长和监护人相关的实验流程，并尊重学生和家长们自愿参加的权力，同时所有决定参加实验的学生及其家长或监护人都保有在任意实验阶段选择退出的权力。

包括学生、老师、家长、及学校在内的实验参与者都将收到匿名保护，其身份不会在研究报告中出现。所收集的实验数据也将被严格保密，仅用于以研究为目，限于本研究员及研究导师的查看与分析，任何其他用途只能在全体参与者的一致答允后进行，实验中所涉及到的录像也会在实验最后阶段被销毁。

如果贵校有意应邀参加本实验，或有关任何疑问需要垂询，请通过邮箱：XXXXXXXX联系我，或联系本人研究导师 XXXXXXXX 博士：XXXXXXXX。由衷感谢您宝贵的时间。

期待回执

Appendix C.3 – Information Sheet for the Teacher (EN/CN)

UNIVERSITY OF OXFORD
DEPARTMENT OF EDUCATION
15 Norham Gardens, Oxford, OX2 6PY
Tel: +44 (0) 1865 274024 Fax: +44 (0)1865 274027
Email: general.enquiries@education.ox.ac.uk
[redacted]

[redacted]

"Word Builders": a teacher-led vocabulary intervention program

TEACHER INFORMATION SHEET

Ethics Approval Reference: pending

1. What is the purpose of this research?

This graduate research project aims to use training in vocabulary structures and reciprocal teaching pedagogy to improve students' vocabulary knowledge. Through this lesson series, children will learn how and why words are "built" in certain structures. For children that are struggling in Chinese literacy, character reading often becomes a bottle-neck for later literacy learning. Shaky reading comprehension also may introduce a new hurdle for young readers in third grades. Because vocabulary knowledge can support children's character identification and reading comprehension, improving children's vocabulary knowledge is crucial for children's Chinese literacy at this age.

2. Why have I been invited to take part?

You and your students have been invited to take part in the program because I would like to work with 3rd grade students enrolled in the public township primary schools of Hainan.

3. Do I have to take part?

No, participation is voluntary and you have the right to withdraw from the study at any time by advising the researcher of this decision. You will face no consequences for choosing not to take part in the study, or for withdrawing. You can and are encouraged to ask questions about the research project before deciding whether or not to participate. Even if you do agree to participate, the participation of your students is still voluntary. Parents will be sent an information sheet and a consent form prior to the start of the program. With the parent's signed consent, children will be allowed to take part in the study. Students will also have the right to withdraw from the study at any time and will face no consequence for dropping out.

4. What will I need to do? What will happen if my students take part in the research?

Your students will take part in the "Word Builders" Chinese vocabulary training lesson series that will take place in your child's classroom during normal Chinese lessons. The training will happen daily over the span of 3 to 5 weeks with each session taking up 15 to 30 minutes. Because an aim of the study is to assist in your student's daily Chinese learning, the vocabulary targeted will be chosen from your student's common Chinese curriculum.

If you decide to opt-in to the study, your child will take part in a pre-test and a post-test to measure the effects of the lesson series. The test will be administered remotely by the student researcher through a computer and the student's answers will be video recorded for analysis purposes and immediately destroyed after the analysis has been completed. A research assistant will be onsite to assist with any technical difficulties and IT issues.

5. Are there any potential risks in taking part?

There are no specific risks involved in taking part. However, if one of your students feels distressed at any point of the assessment, they will be free to stop, without being required to provide any additional information. Their answers will then not be taken into account.

6. Are there any benefits in taking part?

The findings of the study will be shared with you and your school. These findings will hopefully be useful to you and allow you to learn Chinese teaching practices you could potentially choose to implement in your classroom to promote vocabulary learning. Classroom-level results from assessments will also be reported to the school which can be used in future curriculum planning. After the program is complete, you will have the option to receive a professional development program that would further detail how to implement intervention activities in your classroom for future curriculum.

7. What happens to the data provided?

If you agree to participate in this project, the research will be written up as a thesis. On successful submission of the thesis, it will be deposited both in print and online in the University archives, to facilitate its use in future research. There may also be future publication outputs from this research. All the data you provide will be anonymised and your identity will remain confidential. All information is used solely for research purposes and only the supervisor and researcher will have access to the data collected in the research. All data will be encrypted and stored in a password- protected computer and the university server, which only the researchers will have access to and will not be shared with any parties. Once all results are collected, participants will not be contacted again unless upon request, where a short description of the study's overall findings can be sent upon request after completion of the dissertation. Personally identifiable data will be destroyed after completion of the thesis, while other research data will be stored in the university server up to 3 years after the student researcher's completion of the course.

8. Will the research be published?

The University of Oxford is committed to the dissemination of its research for the benefit of society and the economy and, in support of this commitment, has established an online archive of research materials. This archive includes digital copies of student theses successfully submitted as part of a University of Oxford postgraduate degree program. Holding the archive online gives easy access for researchers to the full text of freely available theses, thereby increasing the likely impact and use of that research. The research will be written up as a thesis. On successful submission of the thesis, it will be deposited both in print and online in the University archives, to facilitate its use in future research. The thesis will be openly accessible. There is also a possibility that the thesis will be further submitted to academic journals for publishing.

9. Who is organising and funding the research?

This research constitutes the research project of XXXXXX, a master student in the Department of Education. This research project therefore follows the Department of Education's rules and policies.

10. Who has reviewed this study?

This study has been reviewed by, and received ethics clearance through, the University of Oxford Central University Research Ethics Committee. Reference number: pending

11. Who do I contact if I have a concern about the study or I wish to complain?

If you have a concern about any aspect of this study, please speak to the relevant researcher [XXXXXXXX] or their supervisor [XXXXXXXX], who will do their best to answer your query. The researcher should acknowledge your concern within 10 working days and give you an indication of how they intend to deal with it. If you remain

unhappy or wish to make a formal complaint, please contact the relevant chair of the Research Ethics Committee at the University of Oxford who will seek to resolve the matter in a reasonably expeditious manner: **Social Sciences & Humanities Inter-Divisional Research Ethics Committee**; Email: ethics@socsci.ox.ac.uk; Address: Research Services, University of Oxford,Wellington Square, Oxford OX1 2JD

12. Data Protection

The University of Oxford is the data controller with respect to your personal data, and as such will determine how your personal data is used in the study. The University will process your personal data for the purpose of the research outlined above. Research is a task that we perform in the public interest. Further information about your rights with respect to your personal data is available from http://www.admin.ox.ac.uk/councilsec/compliance/gdpr/individualrights/.

13. Further Information and Contact Details

If you would like to discuss the research with someone beforehand (or if you have questions afterwards), please contact:

XXXXXX, MSc Student
Department of Education
University of Oxford
15 Norham Gardens
Oxford, OX2 6PY

Tel: 07454641495
Email: XXXXXXXX

UNIVERSITY OF OXFORD
DEPARTMENT OF EDUCATION
15 Norham Gardens, Oxford, OX2 6PY
Tel: +44 (0) 1865 274024 Fax: +44 (0)1865 274027
Email: general.enquiries@education.ox.ac.uk
[redacted]

[redacted]

“小小词汇建造师”三年级语文词汇训练

教师信息概述

Ethics Approval Reference: pending

1. **这项研究的目的是什么？**

通过本项目，孩子们将通过学习语文词汇是怎么“建造”出来的，从而提高语文词汇能力。词汇量和理解深度很大程度上影响着孩子的识字量和阅读理解，而认字和词汇对于基础较弱的学生来说是一个瓶颈，同时，阅读理解又是三年级学生的一个语文教学难点。所以在这个阶段增加学生的词汇量和词汇理解深度对于语文学习至关重要。

2. **我为什么被邀参与项目？**

您的孩子被诚挚邀请参与本研究项目因为本项目的研究对象为在乡镇公立小学就读的小学三年级学生。

3. **我必须参与吗？**

不是的。您是可以自愿参与本项目并且在告知项目研究员后，在项目进行的任何阶段选择退出。您的自愿退出无需承担任何后果。项目研究员欢迎您关于项目参与过程与内容的任何垂询。您的学生同时也有权自愿参与或退出本研究项目。学生可以在项目进行的任何阶段选择退出，并无需承担任何后果。同时我们将在项目开始以先给予家长一份项目概况文件，以及一份家长同意书。家长在指定日期前签署表格并上交给老师，学生便可以参与本项目。

4. **我参与研究的内容涉及什么?以及学生将要做什么？**

您班上的学生将会在您的指导下，在每日的语文课时间，进行“小小词汇建造师”的课程系列。本课程系列每次将是 15 分钟，每周将由 5 次，将会为期 5 周。因为本研究项目的目的之一是希望能够配合学生的语文课本知识的巩固和归纳，所以本课程系列所选取的目标词汇将包含小学语文三年级下册的生字生词。在项目结束之后，研究员将会邀请你参与一个训练后的反馈复盘圆桌，为的是了解教师在项目中的体验感。

如果您选择参与本研究项目，您将会统一进行总时长为 6 小时的，针对“小小词汇建造师”的课程系列的教师训练。您班级的学生也将在课程进行之前和之后针对课程效果做一个评估。评估将包括由研究助理一对一进行的测试以及以班级为单位所进行的大班测试。一对一测试将在电脑上进行，孩子的回答将会被语音录制下来，研究员将对其进行分析，分析完毕后，研究员会把录制信息销毁，以保证学生的隐私安全。

5. **参与项目有什么潜在风险吗？**

参与本研究项目没有什么潜在风险。但是学生可以以任何理由退出研究项目，他们在研究中所被录制的信息也不会出现在研究结果当中。

6. **参与项目有什么利处吗？**

研究项目成果将会分享给您的学校，研究员希望本项目的成果能够帮助贵校更好的帮助学生提高语文学习.每个班级的评估结果也将会分享给学校，以便学校和班级老师更好的进行课程规划去好当研究项目结束后，您将有机会继续进行相关的教师培训，以便帮助您更好的将研究项目的成果应用在您的教学当中。

7. 研究结果和收集的数据将会如何处理?

该项目的结果将有助于研究员撰写硕士毕业论文。论文成功提交后，将以印刷版和在线版的形 式存放于牛津大学的档案中，以方便未来的研究使用。本研究今后还有可能会出版发行。您提分供的所有数据都将匿名，您的身份将被保密。所有信息仅用于研究目的，只有导师和研究员才有权限查看研究中收集的数据。所有数据都将被加密并存储在受密码保护的计算机与大学服务 器中，只有研究员才有权限查看并且不会与任何第三方共享。数据收集完毕后，研究员不会再 次联系参与者，但研究员可根据参与者要求在完成论文后以简短概述形式告知研究结果。论文 完成后，个人身份识别数据将被销毁，而其它研究数据将在研究员完成课程后的 3 年内存储 在大学服务器中。

8. 研究结果会公开出版吗？

牛津大学十分重视学术成果对于社会的贡献，因此，建立了研究材料及文章的线上档案，其档案包括了理解牛津学生的研究博士生毕业论文。这样的公开研究成果线上档案提高了学术成果可能对于省会做出的贡献。本研究项目将会被撰写成为研究人员的研究生毕业论文，本论文将出现在此线上档案中。本研究项目也有可能刊登于学术期刊当中。

9. 谁检审了这项研究?

本研究已通过牛津大学中央大学研究伦理委员会 （参考编号: ） 审核并获得道德批准。

10. 如果我对研究有疑虑或者我想投诉，我该联系谁?

如果您对本研究项目有任何方面的疑虑，请联系相关研究员[XXXXXXXX] 或其导师[XXXXXXXX]，她们将竭力回答您的问题。研究人员将在 10 个 工作日内就您的疑虑给予回复，并告诉您她们打算如何处理。若您仍然不满意或希望 出正式 投诉，请联系牛津大学研究伦理委员会的相关主席，该委员会将寻求以合理迅速的方式解决问 题:社会科学与人文科学跨部门研究伦理委员会;电子邮件:ethics@socsci.ox.ac.uk;地址:牛 津大学研究服务，惠灵顿广场，牛津大学 OX1 2JD

11. 更多信息和联系方式 如果您想事先与我们讨论该研究项目，或者如果您之后有任何问题，请联系:

XXXXXX () 教育学院
15 Norham Gardens，Oxford，OX2 6PY 电话:+44(0)1865 274024 传真
:+44(0)1865274027
general.enquiries@education.ox.ac.uk
欢迎您的垂询。

Appendix C.4 – Opt-in Consent Form for all Teachers (En/Cn)

UNIVERSITY OF OXFORD
DEPARTMENT OF EDUCATION
15 Norham Gardens, Oxford, OX2 6PY
Tel: +44 (0) 1865 274024 Fax: +44 (0)1865 274027
Email: general.enquiries@education.ox.ac.uk
[redacted]

[redacted]

"Word Builders": a teacher-led vocabulary intervention program

TEACHER CONSENT FORM

CUREC Approval Reference: PENDING

		Please initial each box
1	I confirm that I have read and understand the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.	☐
2	I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, and without any adverse consequences or academic penalty.	☐
3	I understand that research data collected during the study may be looked at by designated individuals from the University of Oxford where it is relevant to my taking part in this study. I give permission for these individuals to access my students' data.	☐
4	I understand that by consenting to an interview, I will be recorded (video and audio) for research purposes. I understand that all personally identifiable information will be removed from the video recording before the recording is stored for research purposes.	☐
5	I understand that my reflection journal for this intervention will be collected and used for research purposes. I understand that all personally identifiable information will be removed from the journal before the material are stored for research purposes.	☐
6	I understand who will have access to personal data provided, how the data will be stored and what will happen to the data at the end of the project.	☐
7	I understand how this research will be written up and published.	☐
8	I understand how to raise a concern or make a complaint.	☐

	dd / mm / yyyy	
Name of Participant (Teacher)	Date	Signature
	dd / mm / yyyy	
Name of person taking consent	Date	Signature

UNIVERSITY OF OXFORD
DEPARTMENT OF EDUCATION
15 Norham Gardens, Oxford, OX2 6PY
Tel: +44 (0) 1865 274024 Fax: +44 (0)1865 274027
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[redacted]

[redacted]

教师参与同意书

道德批准参考 : PENDING

请在每个方框中填写姓名首字母

1	我确认已阅读并理解上述研究参与者信息表。我已有机会考虑这些信息，提出问题并得到满意的答案。	
2	我理解我的参与是自愿的，我的学生或我可以在不给出任何理由的情况下随时退出研究，并且不会产生任何不良后果，而且以前记录的任何个人数据将被删除。	
3	我理解研究期间收集的研究数据可能会被牛津大学的指定人员查看，这些数据与我 参与本研究有关。我允许这些人访问我的数据。	
4	我理解在接受采访时，我的声音会被录像，用作研究数据分析。我也理解所有个人信息将在储存之前被去除，使得数据完全匿名化。	
5	我理解“教师课堂记录”将会被收集，用作研究数据分析。我也理解所有个人信息将在储存之前被去除，使得数据完全匿名化。	
6	我了解这个项目已经由牛津大学中央大学研究伦理委员会审查，并已获得道德规范批准。	
7	我了解谁有权限查看所提供的个人数据，数据将如何被储存，以及项目结束时数据将会如何处理。	
8	我理解这项研究将如何被编写和发表。	
7	我理解如何提出疑虑或进行投诉。	

老师姓名	日期 dd / mm / yyyy	签名
研究员姓名	日期 dd / mm / yyyy	签名

Appendix C.5 – Parent Information Sheet (En/Cn)

UNIVERSITY OF OXFORD
DEPARTMENT OF EDUCATION
15 Norham Gardens, Oxford, OX2 6PY
Tel: +44 (0) 1865 274024 Fax: +44 (0)1865 274027
Email: general.enquiries@education.ox.ac.uk
[redacted]

[redacted]

Project title: **"Word Builders": a teacher-lead vocabulary intervention program**
Ethics Approval Reference:

Dear Parent,

Your child's class has been chosen to be a part "Word Builders", a Chinese vocabulary training series that will take place during Chinese classes in school. The information you provide will contribute towards a master's dissertation at the University of Oxford. Please read this information carefully and ask the researcher any questions you may have before agreeing to participate in the study. You will also have a chance to attend one of two online evening meetings [insert time, estimated 2-3 days after teachers hand out the parent information sheet] via WeChat to ask any questions to the researcher pertaining to the program. If you are interested in allowing your child to participate in this study, there is a consent form attached to this information sheet that you may sign and return to your child's classroom teacher before [insert time, estimated 5 working days after teachers hand out the parent information sheet].

1. What is the purpose of this research?
This graduate research project aims to use training in vocabulary structures and reciprocal teaching pedagogy to improve students vocabulary knowledge. Through this lesson series, children will learn how and why words are "built" in certain structures. For children that are struggling in Chinese literacy, character reading often becomes a bottle-neck for later literacy learning. Reading comprehension also often introduces a new hurdle for young readers in third grade students. Because vocabulary knowledge can support children's character identification and reading comprehension, improving children's vocabulary knowledge is crucial for children's Chinese literacy at this age.

2. **Why has my child been invited to take part?**

Your child has been invited to take part because I would like to work with 3 grade students enrolled in the public township primary schools of Hainan.

3. Do I have to take part?
You may be asked to hear your child's storytelling and support the child's take home assignment. However, your involvement in the study is entirely voluntary. If you have any issues or questions, you may reach out to the child's teacher or the researcher via e-mail.

4. What will my participation in the study involve and what will children have to do?

Your child will take part in the "Word Builders" Chinese vocabulary training lesson series that will take place in your child's classroom during normal Chinese lessons. The training will happen daily over the span of 3-5

weeks with each session taking up 15-30 mins. Because an aim of the study is to assist in your child's daily Chinese learning, the vocabulary targeted is chosen from your child's common Chinese curriculum.

If you decide to opt-in to the study, your child will take part in a pre-test and a post-test to measure the effects of the lesson series. The test will be administered remotely by the student researcher through a computer and the student's answers will be voice recorded for analysis purposes and immediately destroyed after the analysis has been completed. A research assistant will be onsite to assist with any technical difficulties and IT issues.

5. What do I do if I don't want my child to take part in the study?

Your child's participation in the study is entirely voluntary. You are not required to sign the opt-in form and your child is allowed to drop out at any time during the intervention. You have the right to withdraw your child from the study at any time by advising the school teacher of this decision who will inform the researcher immediately. You and your child will face no consequences for choosing not to take part in the study, or for withdrawing. You can and are encouraged to ask questions about the research project before deciding whether or not to participate.

6. What will happen to the study's findings and data collected?

If you agree to participate in this project, the research will be written up as a thesis. On successful submission of the thesis, it will be deposited both in print and online in the University archives, to facilitate its use in future research. There may also be future publication outputs from this research. All the data you provide will be anonymised and your identity will remain confidential. All information is used solely for research purposes and only the supervisor and researcher will have access to the data collected in the research. All data will be encrypted and stored in a password- protected computer and the university server, which only the researchers will have access to and will not be shared with any parties. Once all results are collected, participants will not be contacted again unless upon request, where a short description of the study's overall findings can be sent upon request after completion of the dissertation. Personally identifiable data will be destroyed after completion of the thesis, while other research data will be stored in the university server up to 3 years after the student researcher's completion of the course.

7. Will the research be published?

The University of Oxford is committed to the dissemination of its research for the benefit of society and the economy and, in support of this commitment, has established an online archive of research materials. This archive includes digital copies of student theses successfully submitted as part of a University of Oxford postgraduate degree program. Holding the archive online gives easy access for researchers to the full text of freely available theses, thereby increasing the likely impact and use of that research. The research will be written up as a thesis. On successful submission of the thesis, it will be deposited both in print and online in the University archives, to facilitate its use in future research. The thesis will be openly accessible. There is also a possibility that the thesis will be further submitted to academic journals for publishing.

8. Who is organising and funding the research?

This research constitutes the research project of XXC, a master student in the Department of Education. This research project therefore follows the Department of Education's rules and policies.

9. Who has reviewed this study?

This study has been reviewed by, and received ethics clearance through, the University of Oxford Central University Research Ethics Committee (Reference number:).

10. **Who do I contact if I have a concern about the study or I wish to complain?**

If you have a concern about any aspect of this study, please speak to the relevant researcher [XXXXXXXX or their supervisor [XXXXXXXX], who will do their best to answer your query. The researcher should acknowledge your concern within 10 working days and give you an indication of how they intend to deal with it. If you remain unhappy or wish to make a formal complaint, please contact the relevant chair of the Research Ethics Committee at the University of Oxford who will seek to resolve the matter in a reasonably expeditious manner: **Social Sciences & Humanities Inter-Divisional Research Ethics Committee**; Email: ethics@socsci.ox.ac.uk; Address: Research Services, University of Oxford, Wellington Square, Oxford OX1 2JD

Your inquiries are most welcome

XXXXXX

UNIVERSITY OF OXFORD
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[redacted]

[redacted]

家长信息表: **“小小词汇建造师”三年级语文词汇训练**

道德批准参考: Pending

亲爱的家长朋友们，

我们诚挚地邀请您的孩子们参加“小小词汇建造师”这项研究项目，这是一项以校内语文课堂为研究环境，以中文词汇锻炼为研究对象的一系列实验课程。您在研究中所贡献的宝贵信息将会帮助完成一篇牛津大学的研究生学位论文。在答允参加此项研究前, 还请各位家长务必详尽阅读此文，如有任何疑问欢迎垂询。

1. **这项研究的目的是什么?**

通过本项目，孩子们将通过学习语文词汇是怎么“建造”出来的，从而提高语文词汇能力。词汇量和理解深度很大程度上影响着孩子的识字量和阅读理解，而认字和词汇对于基础较弱的学生来说是一个瓶颈，同时，阅读理解又是三年级学生的一个语文教学难点。所以在这个阶段增加学生的词汇量和词汇理解深度对于语文学习至关重要。

2. 我为什么被邀参与项目?

我们诚挚地邀请您的孩子参与本研究项目，因为本项目的研究对象为在乡镇公立小学就读的小学三年级学生。

3. 我必须参与吗?

本项目可能会邀请您少量的配合您孩子的家庭作业，如，听您的孩子讲一段故事，等。您是可以自愿参与本项目并且在告知项目研究员后，在项目进行的任何阶段选择退出。您的自愿退出无需承担任何后果。项目研究员欢迎您关于项目参与过程与内容的任何垂询。

4. 我参与研究的内容涉及什么?以及孩子将要做什么?

您的孩子将会在日常语文课堂上参与“小小词汇建造师”中文词汇训练课程。本课程系列每次将是 15 分钟，将会为期 5 周。本课程系列总共为 5 小时。因为本研究项目的目的之一是希望能够配合孩子的语文课本知识的巩固和归纳，所以本课程系列所选取的目标词汇将包含小学语文三年级下册的生字生词。

如果您选择参与本研究项目，您的孩子将会在课程进行之前和之后针对课程效果各完成一项测试评估。评估将包括由研究助理一对一进行的测试以及以班级为单位所进行的大班测试。一对一测试将在电脑上进行，孩子的回答将会被语音录制下来，研究员将对其进行分析，分析完毕后，研究员会把录制信息销毁，以保证学生的隐私安全。

5. 如果我不希望我的孩子参与研究项目，我应该怎么做?

您的孩子有权自愿参与或退出本研究项目。孩子可以在项目中的任意阶段选择退出，同时我们将在项目开始以先给予各位家长申请自愿退出研究的表格。贵家长们可以在规定日期之前将申请自愿退出研究的表格提交给老师或研究员。

6. 研究结果和收集的数据将会如何处理?

该项目的结果将有助于研究员撰写硕士毕业论文。论文成功□交后，将以印刷版和在线版的形 式存放于牛津大学的档案中，以方便未来的研究使用。本研究今后还有可能会出版发行。您提分供的所有数据都将匿名，您的身份将被保密。所有信息仅用于研究目的，只有导师和研究员才 有权限查看研究中收集的数据。所有数据都将被加密并存储在受密码保护的计算机与大学服务 器中，只有研究员才有权限查看并且不会与任何第三方共享。数据收集完毕后，研究员不会再 次联系参与者，但研究员可根据参与者要求在完成论文后以简短□述形式告知研究结果。论文 完成后，个人身份识别数据将被销毁，而其它研究数据将在研究员完成课程后的 3 年内存储 在大学服务器中。

7. 研究结果会公开出版吗?

牛津大学十分重视学术成果对于社会的贡献，因此，建立了研究材料及文章的线上档案，其档案包括了理解牛津学生的研究博士生毕业论文。这样的公开研究成果线上档案提高了学术成果可能对于省会做出的贡献。本研究项目将会被撰写成为研究人员的研究生毕业论文，本论文将出现在此线上档案中。本研究项目也有可能刊登于学术期刊当中。

8. 谁检审了这项研究?

本研究已通过牛津大学中央大学研究伦理委员会(参考编号:pending)审核并获得道德批准。

9. 如果我对研究有疑虑或者我想投诉，我该联系谁?

如果您对本研究项目有任何方面的疑虑，请联系相关研究员[XXXXXXXX] 或其导师[XXXXXXXX]，她们将竭力回答您的问题。研究人员将在 10 个工作日内就您的疑虑给予回复，并告诉您她们打算如何处理。若您仍然不满意或希望□出正式 投诉，请联系牛津大学研究伦理委员会的相关主席，该委员会将寻求以合理迅速的方式解决问题:**社会科学与人文科学跨部门研究伦理委员会**;电子邮件:ethics@socsci.ox.ac.uk;地址:牛津大学研究服务，惠灵顿广场，牛津大学 OX1 2JD

10. 更多信息和联系方式 如果您想事先与我们讨论该研究项目，或者如果您之后有任何问题，请联系:

XXXXXX () 教育学院 15 Norham Gardens，Oxford，OX2 6PY 电话:+44(0)1865 274024 传真:+44(0)1865274027 general.enquiries@education.ox.ac.uk **欢迎您的垂询。**

Appendix C.6 – Parent Consent Form (En/Cn)

UNIVERSITY OF OXFORD
DEPARTMENT OF EDUCATION
15 Norham Gardens, Oxford, OX2 6PY
Tel: +44 (0) 1865 274024 Fax: +44 (0)1865 274027
Email: general.enquiries@education.ox.ac.uk
[redacted]

[redacted]

"Word Builders": a teacher-led vocabulary intervention program

PARENT CONSENT FORM

CUREC Approval Reference: PENDING

		Please initial each box
1	I confirm that I have read and understand the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.	☐
2	I understand that my participation is voluntary and that my child is free to withdraw at any time, without giving any reason, and without any adverse consequences or academic penalty.	☐
3	I understand that by consenting to my child's participation in the study, my child' performance on a set of tests will be video recorded for research purposes. I understand that all personally identifiable information will be removed from the video recording before the recording is stored for research purposes.	☐
4	I understand that research data collected during the study may be looked at by designated individuals from the University of Oxford where it is relevant to my taking part in this study. I give permission for these individuals to access my students' data.	☐
5	I understand that this project has been reviewed by, and received ethics clearance through, the University of Oxford Central University Research Ethics Committee.	☐
6	I understand who will have access to personal data provided, how the data will be stored and what will happen to the data at the end of the project.	☐
7	I understand how this research will be written up and published.	☐
8	I understand how to raise a concern or make a complaint.	☐

	dd / mm / yyyy	
Name of Participant (Teacher)	Date	Signature

	dd / mm / yyyy	
Name of person taking consent	Date	Signature

UNIVERSITY OF OXFORD
DEPARTMENT OF EDUCATION
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Email: general.enquiries@education.ox.ac.uk
[redacted]

[redacted]

家长参与同意书

道德批准参考 : PENDING

请在每个方框中填写姓名首字母

1	我确认已阅读并理解上述研究参与者信息表。我已有机会考虑这些信息，提出问题并得到满意的答案。	☐
2	我理解我的参与是自愿的，我的孩子或我可以在不给出任何理由的情况下随时退出研究，并且不会产生任何不良后果，而且以前记录的任何个人数据将被删除。	☐
3	我理解，当我同意签署家长参与同意书使，我孩子进行语文评估的过程将会被录像，以便评估课程效果	☐
4	我理解，研究期间收集的研究数据可能会被牛津大学的指定人员查看，这些数据与我参与本研究有关。我允许这些人访问我的数据。	☐
5	我了解这个项目已经由牛津大学中央大学研究伦理委员会审查，并已获得道德规范批准。	☐
6	我了解谁有权限查看所提供的个人数据，数据将如何被储存，以及项目结束时数据将会如何处理。	☐
7	我理解这项研究将如何被编写和发表。	☐
8	我理解如何提出疑虑或进行投诉。	☐

dd / mm / yyyy		
老师姓名	日期	签名
dd / mm / yyyy		
研究员姓名	日期	签名

Appendix D– Word Definition Task

Appendix D1– Administrator Script for Word Definition Task

Original Administrator Script:

A: 等一下我会给你读几个语文的词汇，然后你可以告诉我你觉得这些词汇的意思是什么。我们先来试一下。你觉得白兔是什么意思?
A: 对的！我们可以说白兔是一个动物，是长了白色的毛的兔子，等等。我们现在知道该怎么玩这个游戏了，咱们就正式开始吧！我会给你读几个词，有一些是我们学过的，有一些是我们还没学的，你可以告诉我你觉得这些词是什么意思。

[Translation]
A: I'm going to read to you some words and you can tell me what you think they mean. Let's try it out first. What do you think "white rabbit" means?
(anticipated response: it's a type of plant/ it is round and purple/ etc. If no response, the administrator can continue to give an example)
A: Yes, we can say that its an animal, it's a rabbit that has white fur. Etc. Now that we know what to do, I'm going to read out a list of words, some we've learnt before and some we haven't, and you can tell me the meaning of these words.

Appendix C2– Assessment Test Battery for Word Definition Task

Parts of Speech	Taught	Translation	Difficulty Level	Near	Translation	Difficulty Level	Far		Difficulty Level
Noun	鱼贩	fishmonger	18	商贩	vendor	23	稻草	straw	12
	夜幕	a canopy-like night sky	19	天幕	a canopy-like sky	24	旋风	whirlwind	3
	原料	raw material	13	配料	ingredients	16			
Verb	洒落	sprinkle down	1	飘落	falling	5	劝告	advice	2
	感叹	exclamation	14	惊叹	marvel	17	辨认	identify	4
	央求	plea	22	拜求	worshipingly beg	10			
Adj	寂静	stillness	6	平静	calm	9	雪亮	bright	20
	乌黑	jet black	7	漆黑	pitch black	11	轻盈	lightness	21
	皎洁	bright white	8	光洁	bright and clean	15			

* Note. Difficulty level is ranked from least difficult to most difficult, e.g 1 is least difficult, 2 is most difficult.

Appendix E– Lexical Compounding Task

Appendix E1– Administrator Script for Lexical Compounding Task

Original Administrator Script:

Sub-test 1: Construction Task

我们现在来玩一个小小词汇建造师的游戏。我们先来举个例子，看看我们可以怎么样动动小小词汇建造是的脑筋。比如如果我们把太阳落山叫做“日落”，那我们把月亮落山叫什么呢？
对的我们会把它的叫做“月落”。你太棒了！我们现在知道游戏规则了，咱们就正式开始吧！

[Translation]
A: We are going to play a word-building game. I’m going to give you an example of a word, and you are going to use your “word-building” muscle to think of how you would “build” this word. For example, if we call the sun setting at the end of the day “sunset”, what would we call the moon setting at the end of the night?
A: That's right. Moonset. You got it! Now we know the rules, let’s start the game.

Sub-test 2: Production Task

现在我们来换一种方式建造词。这一次呢，我就不给你举例子了，看看你能不能光光听这个词的意思就能把词想出来。比如说，如果我问你像乌鸦一样的黑色叫什么呢？
对的！乌黑。现在你知道游戏该怎么玩了，我们就正式开始吧！

[Translation]
A: Now, I’m going to directly ask you how you would construct a new word based on the definition given. This time around, I’m not going to give an example for each word. So, For example, what would you call A shade of black that is the same as a raven?
A: That's right. Raven black. Perfect! Now we know the rules, let’s start the second part of the game.

Appendix E2– Assessment Test Battery for Lexical Compounding Task

Part 1: Morphological Construction Task		
Noun	石头制作器物的工人叫“石匠”，用银子制器物的工人叫？ [A person that makes things out of stone is called a stone-worker, what do we call someone who makes things out of silver?]	银匠 [silver-worker]
	太阳下山叫“日落”，月亮下山叫什么？ [a sun setting at the end of the day is called sun-set. What do we call a moon setting at the end of the night?]	月落 [moon-set]
Verb	悲伤的唱歌叫“悲歌”，喜悦的歌唱叫什么？ [singing sorrowfully is called “sorrow-sing”. What do we call singing happily?]	喜歌 [happy-sing]
	制做出来一个东西叫“制造”； 搭起来一个东西叫做 [making something through creating is called “create-make”. What do we call making something through building?]	搭造 [build-make]
Adj.	轻得可以飘起来叫“飘轻”，轻得可以飞起来叫什么？ [we call something that's so light it can float as “floating-light”. What do we call something that's so light it can flight?]	飞轻 [flying-light]
	像滚水一样的汤叫“滚烫”，火焰一般的烫叫什么？ [we call something that's as hot as boiling water “boiling-hot”. What do we call something that’s as hot as a flame?]	火烫 [flaming-hot]
Part 2: Morphological Production Task		
Noun	有一种油，是用花做的，这种油可以叫什么？ [What do we call a type of oil that’s made out of flowers?]	花油 [flower oil]
	春季的月亮叫什么？ [What do we call a moon during springtime?]	春月 [spring moon]
Verb	吞食得如蛇一般叫什么？ [How can we describe someone swallowing like a snake?]	蛇吞 [snake-swallowing]
	有商量的议论叫什么？ [How do we call a discussion with negotiation involved?]	商议 [negotiation-discussion]
Adj.	如果像马一样的快叫什么？ [What do we call something that’s as fast as a horse?]	马快 [horse-fast]
	黄的像草一般叫什么？ [What do we call a yellow that’s as yellow as]	草黄 [grass-yellow]

Appendix E– Assessment Test Battery for Cognate Awareness Task

Overview:

Present a list of 20 Mandarin Chinese words (both orally and on the screen). Of these words, 10 words have Mandarin-Lingao cognates, 10 words were neither cognates nor false cognates. Children will be asked to indicate whether these words are cognates or not by choosing "yes（是）" or "no（不是）"

Administer Script:

A: 我们今天来做一个小测试，来看看大家临高话知多少。列表里呢，有 20 个词汇，有一些词临高话和普通话听起来是一样的。

A: 比如"葡萄"临高话和普通话听起来特别像，对吗？

有一些词呢，临高话和普通话听起来是完全不一样的，比如"小孩"临高话怎么说？对的！听起来很不一样对吗？

A: 接下来呢，我给大家一些时间，在这 20 个词汇里面，如果你觉得这个词临高话和普通话听起来是一样的，你就把这个词旁边的"是"选项圈起来，如果你觉得他不是，你就可以圈这个词旁边的"不是"这个选项。咱们来用 20 分钟试着做一做。

[Translation]
Today we're going to try a little quiz to see how much you know about the Lingao language. in this list, we have 20 words, some of them sound very similar in both Mandarin Chinese and Lingao. for example , the word "grape" sounds very similar in both languages. However, the word "child" sounds very different in the two languages. Now, you can go through the list of these 20 words. if you think that this word sounds the same in the Lingao language and in Mandarin , you can say "YES". If you think that the word sounds different in the two languages you can say "NO".

Sample of Item list:

红衫鱼（Red Gold Thread Fish）	是 Yes	不是 No
二舅 （Second oldest uncle）	是 Yes	不是 No
深海 （Deep sea）	是 Yes	不是 No
感叹 （exclaim）	是 Yes	不是 No
飘落 （drift/fall-down）	是 Yes	不是 No

Appendix F: Teacher Training Manual Sample

[**Summary of Content**]

The teacher training manual will be used as teachers' self-study material, workshop exercise handouts, and lesson planning guide. The manual will specifically train intervention teachers on vocabulary knowledge in three types of subordinate compound word structures and how to apply this knowledge in instructing vocabulary for the intervention. The manual will include a) concepts and pedagogy on learning compound-word structures in vocabulary, b) the children's story and target words for the module, c) discussion questions for the teacher training live workshops, and b) lesson plans for each session.

a) Sample of "concepts and pedagogy on learning compound-word structures in vocabulary"

1. 模块一

1.1 偏正结构中的定中结构

【自主学习室】

定中结构 指，定语+中心语（名、代）,即名词前的修饰成份做定语.定中短语的修饰语是定语,充当中心语的一般是体词性成分,定语从领属、范围、质料、形式、性质、数量、用途、时间、处所等方面描写或限制中心语，如：白兔，其中“白”作为定语，修饰作为中心语的“兔” ，即指“白”色的“兔”。

b) Sample of "discussion questions for the teacher training live workshops

自主学习室 任务打卡

1. 通读一遍全文，请想象一下，如果你给孩子们讲这个故事，你会以什么样的方式阅读给小朋友们，让他们更好的感受到故事的场景性？你可以用文字/视频/音频的方式展现。（如，给你家的小朋友讲一遍这个故事，并录下来这个过程等）
2. 请关注生词列表里的词汇，请你分析一下这三个词的定中结构，和这个词围绕中心于，还可以组成那些词？请讲你能想到的词填写在词汇思维导读上。
3. 你有看到这篇文章的其他定中结构的词吗？请讲你能想到的词填写在词汇思维导读上。

c) Sample of "lesson plans for each session"

课时 2: 生词结构探索 流程概括

过程	内容	时间
介绍	让学生把昨天填写好的词汇思维导图部分拿出来，并对班级小朋友进行每组 4 人的分组	2 min
故事阅读	老师把学生分成 4 人一小组，进行小组故事阅读。学生每个小节轮流阅读，共同完成小节的阅读。	5min
生词结构的讲解	讲解"名词"作为主体的词汇小房子结构	5min
根据学生昨天在"词汇云"中所填写的词进行分析	1. 我们在词汇云中所填写的词和这个词汇小房子的结构一样吗？ 2. 目标词的结构能帮助我们弄清楚这个词的意思吗？词云中和目标词结构一样的词呢？我们可以根据结构弄清楚它们的意思吗？ 3. 如果把目标词换成词云里结构一样的词，故事中的句子会改变意思吗？	5 min
回顾&作业	复习本堂内容，并布置课后小任务 1. 请把词云中和目标词结构一样的生词圈起来 2. 试一试再从故事里找到一个和目标词一样结构的词，把它填写再词汇思维导图上 **3. 想一想目标词和你新写的词用临高话怎么说呢？（如果不确定，可以问问爸爸妈妈，明天一起看看咱们大家说的准不准）**	3 min
		20mins

Appendix G: Children's Book Sample

Sample of the Children's book used, Huihui's night at sea.

[Translation of text]

Summer vacation is finally here. Huihui is visiting her grandma's house that is by the sea. There were many fishing boats by the dock near her grandma's house.

One day, grandma was telling Huihui stories about how she used to go fishing with her family when she was little. Huihui was mesmerised by the storeys that her grandma was telling her. Huihui's uncle was telling her how this is the best season for catching red gold thread fish. "tonight me and your grandma are going out to try and catch some red gold thread fish for our family get-together tomorrow! " Huihui was ecstatic and said : "I want to come too!"

慧慧向海面放眼望去，海浪一阵一阵拍打着船边，轻轻地摇动着渔船。月光照在远处半岛的海岸和山峰上，像一幅美丽的水墨画。在离他们船远远的海面上，还零星地分布着其他的渔船。

不知过了多久，二伯突然说道："可以收网了，看来今天咱们的运气不错。"在月光和手电筒的照耀下，慧慧隐约能看到网里有着许许多多的黑影在游动着。

慧慧听话地坐在一边，看着二伯把大大的渔网一节一节往大海里抛。强壮的二伯随着大海波浪的韵律慢慢地将渔网向海浪里抛去，像是在与大海共舞。慧慧目不转睛地看着二伯撒网，咸咸的海水随着二伯摆动的渔网不时地**洒落**在小船上。

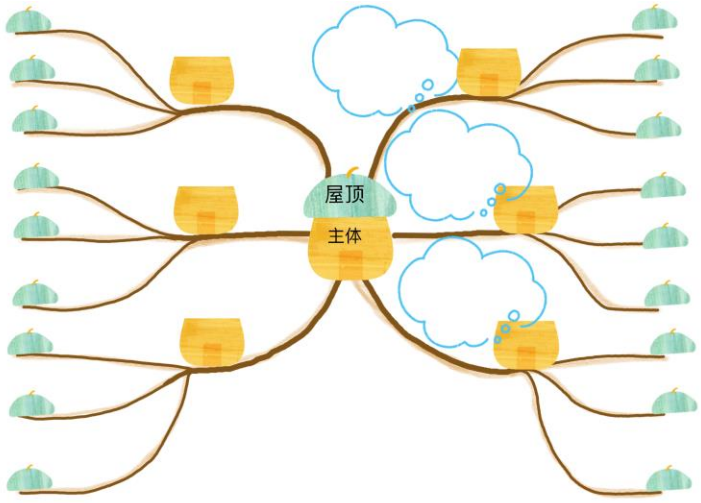
"我们需要等多久呢？"慧慧问道。"大概一个小时吧，你可以先睡一觉，等到收网了，我们才叫你。还有啊，二伯要专心捕鱼，要不你去陪奶奶坐着。"二伯边吁吁喘气边回答道。

慧慧随即来到了奶奶这一边。船的另一头，奶奶在海风中驶着舵，海风不断地吹动着奶奶的衣裳，但奶奶纹丝不动，威风凛凛。

Appendix H: Student In-class activities and Discussion Questions "Word Map" Sample

1） In-class handouts and discussion questions

2) Word map



Appendix I: Semi-structured Interview Questions

[English translation of semi-structured interview questions]

On teacher training

1. Was the training content clear and easy to follow?
2. How applicable was it for your implementation of the lesson series?
3. How helpful overall was it for you?
4. Do you think teacher training like this would be helpful in the future for you or your colleagues?
5. What other advice or comments would you like to make on the teacher training?

On intervention implementation

1. How effective do you think was the intervention on children's vocabulary learning?
2. How was the process of teaching the lesson series for you?
3. Do you think you had the necessary support for the lesson series to be implemented smoothly?
4. How was the new teaching format? Was it new to you? What was the adjustment like?
5. What other advice or comments would you like to make on the intervention implementation?

On materials used

1. How appropriate was the materials used for the children's skill level?
2. What did you think about the teacher training manual?
3. What did you think about the children's book?
4. What did you think about the accompanying vocabulary practice booklet?
5. What other advice or comments would you like to make on the materials used?

[Chinese original version of semi-structured interview questions]

教师培训

1. 你认为培训的内容清晰吗？
2. 你认为培训的内容对于课程系列的开展，应用性强吗？
3. 你认为教师培训整体来说对你有用吗？
4. 如果未来有类似的教师培训，你认为对于你和你的同事有用吗？
5. 对于教师培训你有什么其他的建议和评论吗？

课程系列

1. 你认为课程系列对于小朋友们提高词汇有帮助吗？
2. 你对于教授本课程系列的体验感有什么想法？
3. 你认为在教授本课程系列的过程中有收到足够的帮助和支持吗？
4. 你对于这样子的教授方式熟悉吗？对于你来说，有没有一个对于新的教学方式的适应期？
5. 对于课程系列你有什么其他的建议和评论吗？

教学材料

1. 你认为教学材料适应你的学生们的语文水平吗？
2. 你对于教师培训手册有什么想法？
3. 你对于儿童故事书有什么样的想法？
4. 你对于“小小词汇建造师”的练习册有什么样的想法？
5. 对于教学材料你有什么其他的建议和评论吗？

Appendix J: SPSS Output for Reliability Testing for Assessments

Internal consistency

Reliability=2r/(1+r)

MCT= .471*2/(1+.471) = 0.64

WDT=.745*2/(1+.754)= 0.85

		Pre Test Morphological Awareness Task Total Score	BPre Test Morphological Awareness Task Total Score	Pre Test Morpholoical Production Task	Pre Test Morphological construction Task	Pre Test Word Definition Task Total Score	bPre Test Morpholoical Production Task	bPre Test Morphological construction Task	bPre Test Word Definition Task Total Score
Pre Test Morphological Awareness Task Total Score	Pearson Correlation	1	.471**	.680**	.857**	.403**	.424**	.329*	.390**
	Sig. (2-tailed)		<.001	<.001	<.001	.002	<.001	.012	.002
	N	58	58	58	58	58	58	58	58
BPre Test Morphological Awareness Task Total Score	Pearson Correlation	.471**	1	.293*	.423**	.287*	.799**	.800**	.227
	Sig. (2-tailed)	<.001		.025	<.001	.029	<.001	<.001	.087
	N	58	58	58	58	58	58	58	58
Pre Test Morpholoical Production Task	Pearson Correlation	.680**	.293*	1	.206	.102	.374**	.095	.197
	Sig. (2-tailed)	<.001	.025		.121	.444	.004	.476	.139
	N	58	58	58	58	58	58	58	58
Pre Test Morphological construction Task	Pearson Correlation	.857**	.423**	.206	1	.466**	.303*	.373**	.382**
	Sig. (2-tailed)	<.001	<.001	.121		<.001	.021	.004	.003
	N	58	58	58	58	58	58	58	58
Pre Test Word Definition Task Total Score	Pearson Correlation	.403**	.287*	.102	.466**	1	.331*	.129	.745**
	Sig. (2-tailed)	.002	.029	.444	<.001		.011	.336	<.001
	N	58	58	58	58	58	58	58	58
bPre Test Morpholoical Production Task	Pearson Correlation	.424**	.799**	.374**	.303*	.331*	1	.279*	.206
	Sig. (2-tailed)	<.001	<.001	.004	.021	.011		.034	.121
	N	58	58	58	58	58	58	58	58
bPre Test Morphological construction Task	Pearson Correlation	.329*	.800**	.095	.373**	.129	.279*	1	.156
	Sig. (2-tailed)	.012	<.001	.476	.004	.336	.034		.241
	N	58	58	58	58	58	58	58	58
bPre Test Word Definition Task Total Score	Pearson Correlation	.390**	.227	.197	.382**	.745**	.206	.156	1
	Sig. (2-tailed)	.002	.087	.139	.003	<.001	.121	.241	
	N	58	58	58	58	58	58	58	58

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Appendix K: Paired Samples *t*-test: SPSS output for assumptions testing and statistical test

1) Assumptions Testing for Normality

Descriptive Statistics

	N	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Std. Error
LCTdifference	57	.489	.316	1.242	.623
WDTdifference	57	-.338	.316	-.077	.623
Valid N (listwise)	57				

2) SPSS Output for *t*-test

T-Test

```
[DataSet1] /Users/naijingguo_1/Desktop/Dissertation/quant data analysis/CRT_Sum Data 0808.sav
```

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre MCT	28.91	57	9.129	1.209
	Post MCT	37.91	57	7.797	1.033
Pair 2	Pre WDT	34.49	57	14.829	1.964
	Post WDT	62.93	57	17.081	2.262

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	Pre MCT & Post MCT	57	.440	<.001
Pair 2	Pre WDT & Post WDT	57	.342	.009

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Pre MCT - Post MCT	-9.000	9.030	1.196	-11.396	-6.604	-7.525	56	<.001
Pair 2	Pre WDT - Post WDT	-28.439	18.395	2.436	-33.319	-23.558	-11.672	56	<.001

Paired Samples Effect Sizes

			Standardizer[a]	Point Estimate	95% Confidence Interval Lower	Upper
Pair 1	Pre MCT - Post MCT	Cohen's d	9.030	-.997	-1.312	-.675
		Hedges' correction	9.091	-.990	-1.303	-.671
Pair 2	Pre WDT - Post WDT	Cohen's d	18.395	-1.546	-1.929	-1.157
		Hedges' correction	18.519	-1.536	-1.916	-1.149

a. The denominator used in estimating the effect sizes.
Cohen's d uses the sample standard deviation of the mean difference.
Hedges' correction uses the sample standard deviation of the mean difference, plus a correction factor.

Appendix L: ANOVA: SPSS output for assumptions testing and statistical test

1) Test for Sphericity

Mauchly's Test of Sphericity[a]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[b] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Time	1.000	.000	0	.	1.000	1.000	1.000
Exposure	.805	11.923	2	.003	.837	.860	.500
Time * Exposure	.907	5.391	2	.068	.915	.944	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. Design: Intercept
Within Subjects Design: Time + Exposure + Time * Exposure

b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

2) ANOVA testing

Time: $F(1, 56) = 124.03$ ($p < 0.001$)

Nature of Exposure: $F(1, 56) = 0.75$ ($p = 0.38$)

Time*Nature of Exposure: $F(1,56) = 10.8$ ($p = 0.002$)

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Time	Sphericity Assumed	7.112	1	7.112	124.028	<.001
	Greenhouse-Geisser	7.112	1.000	7.112	124.028	<.001
	Huynh-Feldt	7.112	1.000	7.112	124.028	<.001
	Lower-bound	7.112	1.000	7.112	124.028	<.001
Error(Time)	Sphericity Assumed	3.211	56	.057		
	Greenhouse-Geisser	3.211	56.000	.057		
	Huynh-Feldt	3.211	56.000	.057		
	Lower-bound	3.211	56.000	.057		
Exposure	Sphericity Assumed	.021	2	.010	.794	.454
	Greenhouse-Geisser	.021	1.674	.012	.794	.435
	Huynh-Feldt	.021	1.719	.012	.794	.438
	Lower-bound	.021	1.000	.021	.794	.377
Error(Exposure)	Sphericity Assumed	1.446	112	.013		
	Greenhouse-Geisser	1.446	93.732	.015		
	Huynh-Feldt	1.446	96.284	.015		
	Lower-bound	1.446	56.000	.026		
Time * Exposure	Sphericity Assumed	.178	2	.089	10.793	<.001
	Greenhouse-Geisser	.178	1.829	.097	10.793	<.001
	Huynh-Feldt	.178	1.888	.094	10.793	<.001
	Lower-bound	.178	1.000	.178	10.793	.002
Error(Time*Exposure)	Sphericity Assumed	.923	112	.008		
	Greenhouse-Geisser	.923	102.436	.009		
	Huynh-Feldt	.923	105.718	.009		
	Lower-bound	.923	56.000	.016		

Appendix M: Pearson's Correlations: SPSS output for assumptions testing and statistical test

M1: Normality Testing

Descriptive Statistics

	N	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Std. Error
LCTdifference	57	.489	.316	1.242	.623
WDTdifference	57	-.338	.316	-.077	.623
Valid N (listwise)	57				

M2: Pearson's Correlations SPSS output

```
CORRELATIONS
  /VARIABLES=GainWDT PreWDT
  /PRINT=TWOTAIL NOSIG FULL
  /MISSING=PAIRWISE.
```

Correlations

Correlations

		GainWDT	Pre WDT
GainWDT	Pearson Correlation	1	-.489**
	Sig. (2-tailed)		<.001
	N	57	57
Pre WDT	Pearson Correlation	-.489**	1
	Sig. (2-tailed)	<.001	
	N	57	57

**. Correlation is significant at the 0.01 level (2-tailed).

```
CORRELATIONS
  /VARIABLES=PreMCT GainMCT
  /PRINT=TWOTAIL NOSIG FULL
  /MISSING=PAIRWISE.
```

Correlations

Correlations

		Pre MCT	Post-Pre MCT
Pre MCT	Pearson Correlation	1	-.631**
	Sig. (2-tailed)		<.001
	N	57	57
Post-Pre MCT	Pearson Correlation	-.631**	1
	Sig. (2-tailed)	<.001	
	N	57	57

**. Correlation is significant at the 0.01 level (2-tailed).