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山东大学

硕士学位论文

中学词汇教学双优组合研究——元认知策略和思维导图

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中文摘要

英语语言的学习需要大量的词汇。近来国家提倡素质教育，教育中心由教转为学，目的为了培养学生的在校学习能力及以后的持续学习能力。教师面临着如何最有效地帮助学生储存并提取目标语单词的挑战。由于对于词汇之间的关系甚至有关这些概念的元知识相当匮乏，教师在英语严重两极分化面前困惑不解，束手无策，一次又一次的失败使学生一筹莫展，丧失信心。

二十世纪七十年代以来，二语习得和认知心理学领域中关于记忆策略的实验研究和对英语词汇学习产生了积极的影响。许多研究表明元认知策略和词汇学习具有正相关性。然而，对元认知策略的明确指导性和实际操作性针对中学生的研究却很少。鉴于此，本文欲论证元认知策略和思维导图在高中英语词汇学习中的优势。

思维导图（又称脑图）是脑神经科学，记忆学，心理学，语言学在英语领域创造性应用的最新科研成果。它利用人的左右脑协调原理，对英语单词进行合理拆分并借助电脑精美的动漫，使每一个单词都变成音，形，意的完美统一体，从而帮助学习者实现快速记忆单词并不会遗忘的梦想（李刚，2006）。思维导图作为新生事物，尽管人们对此争议颇多，目前尚未在中学词汇教学中得以推广，但是作者认为值得尝试。因为效果比道理更重要。能高效记住单词的方法才是好方法。词汇记忆因人而异。如何尊重学生的个体差异并满足不同学生的不同学习需求，真正实现面向全体学生，为学生的终生发展奠定基础是中学英语教学的严峻课题。

为此，作者提供了一个在英语课堂实施策略培训的模式。该模式分五个步骤—准备，介绍，操练，评估，迁移。为了使论证真实有效，作者通过两方面收集数据资料，包括元认知策略问卷调查和英语词汇测试。参加元认知策略和脑图双优组合培训实验研究的是作者教授的跃华学校高一的两个平行班的100名学生。一班为实验组，另一班为参照组。实验数据来自他们培训前的元认知策略调查问卷和培训前后的词汇测试分数并经过SPSS数据分析。

对培训结果的分析研究显示，元认知策略和脑图双优组合培训对中国高中学生的词汇学习具有积极作用。在实验结果的基础上，作者对于词汇教学提出了一些建议，并介绍了自己在实际教学中的经验和方法。当然，在这一方面还需要更多的研究，如其它一些记忆策略的有效性等，有待外语工作者作出更多的努力。

关键词：策略培训；元认知策略；思维导图；脑图；词汇学习

ABSTRACT

Mastering a large vocabulary is necessary for English language learning. Recently quality education has been advocated in middle schools in our country that shifts the focus from teaching to learning in order to develop students' ability which is important for them not only at school but also afterwards. With this shift in emphasis, the classroom teacher is faced with the challenge of how best to help students store and retrieve words in the target language. However, our understanding of the relationships between words, even the metalanguage to discuss those concepts, is decidedly lacking. Faced with serious problem of division among students into opposing extremes, teachers feel puzzled and helpless. As a result, they are at a loss what to do. When confronted with failures again and again, students become discouraged and finally give up.

Since the 1970s great contributions have been made in the field of second language learning and teaching and in the area of cognitive psychology, including the experimental studies on memory strategies. Many research studies carried out have proved that metacognitve strategies have positive relationship with vocabulary learning. However, little has been done on middle school students due to the lack of experience on explicit instruction and actual manipulation of metacognitive strategies.

Mind-mapping is the latest scientific achievements in the field of English research to which science of cranial nerve, memory, psychology and linguistics are creatively applied. Based on the co-ordination of human's left and right brains, each English word is separated reasonably and a computer-assisted flash picture makes it possible for learners to memorize its pronunciation, spelling and meaning quickly. Though mind-mapping is newly-born, controversial and unpopularized in vocabulary teaching in middle school, yet it is worth attempting. For effect is more important than argument. Any strategy will be the best one if it achieves the best effect. Different learners may have different strategies in memorizing words. It is a new task how to respect students' individuality, meet their different demands, how to cater for most students and lay a solid foundation for their lifelong learning.

In view of the controversy over the necessity and feasibility of strategy training, this thesis aimed to demonstrate the validity of metacognitive strategy training and mind-mapping in vocabulary learning in middle school students. To achieve this, the writer presented a framework with a five-step model for strategy training in formal English classes ---preparation, presentation, practice, evaluation and expansion. To ensure the authenticity and validity, two sources were collected for data analysis including questionnaires on metacognitive strategies and English vocabulary tests. The subjects were 100 senior middle school students from Yuehua School in two natural classes, with the present author as their teacher. One class was appointed as experimental class (EC), the other as control class (CC). The research data came from their scores in the pre- and post-vocabulary tests and the pre-training metacognitive strategy questionnaire. In the end data was analyzed by SPSS.

The results showed that explicit training of MS and mind-mapping has significant positive effect on the vocabulary learning of Chinese senior students. Based on the findings of the study, suggestions on lexical teaching were provided. Of course, more work should be done in this area for many strategies proved effective in western countries should be tested if they are effective for Chinese students.

Key words: strategy instruction; metacognitive strategies; mind-mapping; vocabulary learning.

LIST OF ABBREVIATIONS

CCFVT..... Control class first vocabulary test

CCSVT.....Control class second vocabulary test

ECFVT.....Experimental class first vocabulary test

ECSVT.....Experimental class second vocabulary test

EFL.....English as foreign language

ESL.....English as second language

FL.....Foreign language

L2.....Second language

LTM.....Long-term memory

M..... ...Means

MS.....Metacognitive strategies

MSMM.....Metacognitive strategies and mind-mapping

N.....The number of students

NCEE.....National college entrance examination

SD.....Standard difference

SM.....Sensory memory

STM.....Short-term memory

Sbig.....the big sample

Ssmall.....the small sample

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Chapter 1 Introduction

As we enter the 21st century, acquisition of vocabulary has assumed, as some would argue, the central role in learning a second language (Lewis, 1993). However, our understanding of the relationships between words, even the metalanguage to discuss those concepts, is decidedly lacking (Maiguashca, 1993). Recently our country has advocated quality education that shifts the focus from teaching to learning in order to develop students' learning ability which is important for students not only at school but also afterwards. With this shift in emphasis, the classroom teacher is faced with the challenge of how best to help students store and retrieve words in the target language. So it is urgent to find the corresponding strategies to overcome the obstacles. Meanwhile, the teachers can not —should not –help students learn all of them. One of the special aims of teaching is to help students concentrate their limited resources on learning the most useful ones (Schmitt and McCarthy, 2002: 216) so as to become independent, responsible for their own learning.

1.1 The necessity for the study

"There is now a wealth of material that has been developed to train learners to use effective language learning strategies: for example, Ellis and Sinclair 1989; Brown 1989; Oxford 1990; Wenden 1986b and 1991. Somewhat surprisingly, however, there have been few empirical studies that have attempted to evaluate the success of this training on L2 learners" (Ellis, 1994: 556). Metacognition was firstly used by American psychologist Flavel in 1976. It is thinking about one's own thinking; it is the knowledge about one's own cognitive system and the essential skill for learning to learn. Coady et al. (1993) experimented with computer-assisted learning of the 2000 most-frequent words in English and concluded that using computers to learn the list was an efficient use of time and it resulted in higher reading proficiency. Current research would suggest that it is worthwhile to add explicit vocabulary instruction in the L2 classroom (Schmitt and McCarthy, 2002).

Nevertheless, the question remains about how best to implement this kind of vocabulary instruction in the classroom. The present study of combination of metacognitive strategy and mind-mapping instruction seems to fill the gap of previous research.

The relevant research in our country began from 1990s. Some of them focused on the using of different strategies, some on relationships between examination scores and choosing of strategies. But the research of combination of MSMM with computer-assisted learning is not common.

In this thesis, some obstacles will be discussed and the corresponding strategies will be advocated. The research will process by tests, several interviews and a questionnaire. First, some literatures taken as theoretical grounding will be reviewed. Then, an experiment will process and the result will be analyzed. Finally, the author will propose some strategies.

1.2 The importance of vocabulary in language learning

Vocabulary, as the foundation of all language skills, plays a vital part in language learning. Words, or rather morphemes, words and idioms, are the carriers and conveyors of meaning. Without vocabulary, nothing can be achieved in listening, speaking reading and writing. It is important to acquire as many words as possible. Vocabulary is the building material of a language. Just as a building cannot be constructed without the building material, without words to express a wide range of meanings, communication in that language cannot happen in any meaningful way. And it has also been consistently demonstrated that reading comprehension is strongly related to vocabulary knowledge, more strongly than the other components of reading.

1.3 Problems in vocabulary learning

As many teachers of FL (foreign language) will attest, when our students meet an unfamiliar text in the foreign language, the first challenge seems to be its vocabulary. Students seem to forget words quicker than to memorize them. In fact, vocabulary learning has been a headache for both teachers and students. It remains a "time consuming and

poorly efficient" in high school. It is common to hear complaints from the students who forget almost all the new words that they have just memorized. Teachers often complain that students are too lazy to read extensively, let alone memorize words from outside classroom materials to enlarge their vocabulary. Students' great weakness in vocabulary results in even greater difficulty in language learning.

So what is the root of the problem?

1) According to Richards (1976), knowing a word means knowing how often it occurs, the company it keeps, its appropriateness in different situations, its syntactic behavior, its underlying form and derivations, its word associations, and its semantic features (Schmitt and McCarthy, 2002). A more accurate understanding of its meaning and use will not develop unless the student meets the word through a variety of activities and in different contexts. The multiplicity of features to be learned increases the probability of words being problematic since problems can arise from one or more of the areas.

2) Vocabulary teaching has been ignored for three reasons. First, it is impossible for teachers to teach all the words encountered and vocabulary development undoubtedly relies on students' own efforts. Next, research into vocabulary learning in high school has been weak. Most of the successful research has little been applied to high school students. Third, it seems that only a small number of vocabularies's meaning and spelling is involved in NCEE (National College Entrance Examination).

As a result, little attention has been paid to new words. Almost all the open classes are dialogues or reading classes. Meanwhile, students are kept busy with test-oriented papers in the form of multiple choices. In spite of great efforts in English learning, they still have great difficulty due to the lack of effective strategies in vocabulary learning. With so many other subjects to deal with and so little time to spare, students are suffering from great anxiety and high pressure from school, parents and society. They long for effective instruction or a special tool to help themselves out. The simpler the instruction is, the better it will be. .So it is the teachers who are responsible for helping the students walk out of the shadow of anxiety and discouragement. Then what vocabulary does a language learner need? And how does he acquire a certain amount of vocabulary in the shortest time? Students need a vocabulary of about 3000 words before we can efficiently learn from

context (Liu and Nation, 1985). So how do teachers help their students get to the threshold where they can start to learn from context independently? Many research results imply that learners who are taught to use strategies and are provided with sufficient practice in using them will learn more effectively than students who have had no experience with learning strategies (Schmitt and McCarthy, 2002). What strategies do Chinese learners use and believe to be helpful? How do teachers implement strategy instruction in L2 classroom? How can a Senior One student maximize the effectiveness of his choice of learning strategies? All the problems are worthwhile to be discussed.

1.4 Research questions

The objective of this study is to determine if MS training can be combined with mind-mapping to both facilitate Senior Grade One students' vocabulary learning and retention. The writer of the present study will investigate the effect of MS training through the use of explicit strategy instruction on the development of lexical knowledge of Chinese Senior High students with the help of mind-mapping, with computer's assistance.

In the study, the writer intends to answer the following research questions:

1) Is there any positive relation between students' MSMM and their English proficiency?
2) Is there any positive relation between Chinese students' MSMM and their English vocabulary size?
3) Does explicit training improve Chinese high school students' English vocabulary learning?

Chapter 2 Research Review

2.1 Introduction

In this chapter we will consider "the mediating role" (Ellis, 1994: 529) that learning strategies play between various learner factors and learning outcomes. According to the model of L2 acquisition (see figure 1), individual learner differences together with various situational factors determine the learners' choice of learning strategies. These then influence learning outcomes. The success that learners experience can also affect their choice of strategies. We will begin with definitions of 'learning strategies' and the main methods used to investigate them. This will be followed by classification of learning strategies. The next section will deal with the relationship between learning strategies and L2 learning Finally, attempts to train learners to employ particular strategies will be considered.

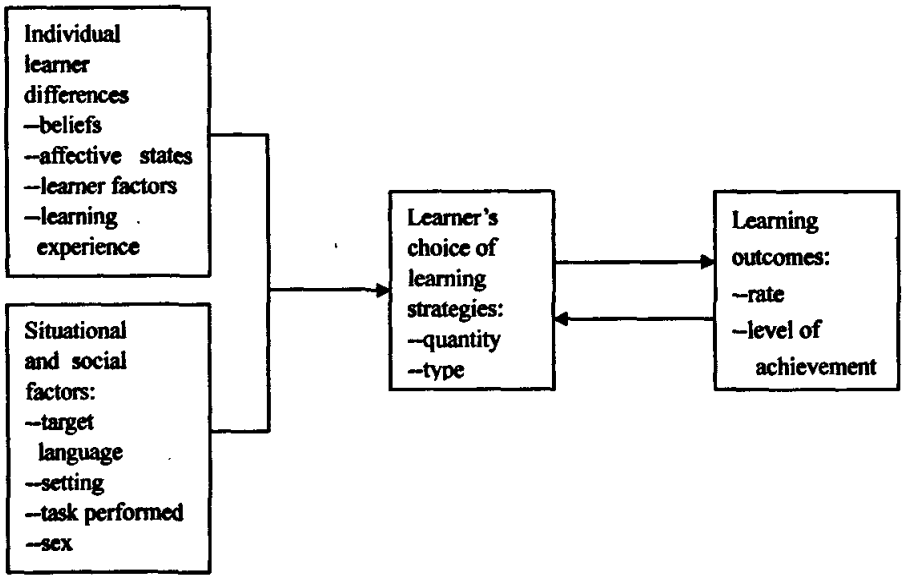

Figure 1.The relationship between individual learner differences, situational factors, learning strategies, and learning outcomes (Ellis, 1994: 530)

2.2 Definition of learning strategies

According to Rod Ellis (1994), based on definitions of language learning strategies from the recent literature, the following list characterizes how the term "strategies" has been used in the studies:

Strategies refer to both general approaches and specific actions or techniques used to learn an L2.

Strategies are problem-oriented—the learner deploys a strategy to overcome some particular learning problem.

Learners are generally aware of the strategies they use and can identify what they consist of if they are asked to pay attention to what they are doing/thinking.

Strategies involve linguistic behavior (such as requesting the name of an object) and non-linguistic (such as pointing at an object so as to be told its name).

Linguistic strategies can be performed in the L1 and in the L2.

Some strategies are behavioral while others are mental. Thus some strategies are directly observable, while others are not.

In the main, strategies contribute indirectly to learning by providing learners with data about the L2 which they can then process. However, some strategies may also contribute directly (for example, memorization strategies directed at specific lexical items or grammatical rules).

Strategies use varies considerably as a result of both the kind of task the learner is engaged in and individual learner preferences.

(Ellis, 1994: 351-53)

Anderson (1980, 1983) distinguishes three stages of skill-learning: 1) the cognitive stage, 2) the associative stage, 3) the automatic stage. His theory is favored by Rabinowitz and Chi (as cited in O'Malley and Chamot, 1990) that strategies only occur in the early cognitive stage when they are conscious; they cease to be "strategic" when they are performed automatically. Therefore, for research purposes, strategies can be used to solve some learning problems.

2.3 Methods used to investigate learning strategies

Attempts have been made to identify different learning strategies by observing learners performing a variety of tasks. A method found to be more successful involves interviews and questionnaires. A large number of studies have used these methods (Politzer and McGroarty, 1985; Oxford, 1990; Wenden, 1987). Such methods have provided the most detailed information about learning strategies.

Diary studies serve as another way of collecting information on learning strategies .The diary studies have been used to reflect the learners' affective states, how these influence learning and to explore learning strategies as well (Brown and Perry, 1991).

Think-aloud tasks have also been used profitably (Mangubhai, 1993). Haastrup (1987) and Morren (1993) found that "pair thinking aloud" provided "rich and informative data" (1987: 202).

Many of the most successful studies have employed multiple data collection procedures. As O'Malley and Chamot (1990: 95) points out, however, what puzzles us is that the strategies identified by each procedure often vary considerably. Many of the earlier studies of learner strategies (for example, Naiman et al., 1978) were entirely exploratory, aiming at identifying and describing a broad range of strategies. More recent studies (for example, O'Malley, 1987; Manghubai, 1993) have tended to focus on the strategies used to learn while performing individual tasks.

2.4 Classification of learning strategies

Based on the earlier research, O'Malley and Chamot has made an important contribution to our knowledge of learning strategies. In O'Malley and Chamot's framework (see Table, Ellis, 1994: 537-38) three major types of strategy are distinguished, based on the information-processing model.

Learning Strategy	Description

Metacognitive	
Advance organizers-	Making a general but comprehensive preview of the concept or principle in an anticipated learning activity
Directed attention	Deciding in advance to attend in general to a learning task and to ignore irrelevant distractors.
Selective attention	Deciding in advance to attend to specific aspects of language input or situational details that will cue the retention of language input.
Self-management	Understanding the conditions that help one learn and arranging for the presence of those conditions.
Advance preparation	Planning for and rehearsing linguistic components necessary to carry out an upcoming language task.
Self-monitoring	Correcting one's speech for accuracy in pronunciation, grammar, vocabulary, or for appropriateness related to the setting or to the people who are present.
Delayed production	Consciously deciding to postpone speaking to learn initially through listening comprehension.
Self-evaluation	Checking the outcomes of one's own language learning against an internal measure of completeness and accuracy.
Cognitive	
Repetition	Imitating a language model, including overt practice and silent rehearsal.
Resourcing	Defining or expanding a definition of a word or

	concept through use of target language reference materials.
Directed physical response	Relating new information to physical actions, as with directives.
Translation	Use the first language as a base for understanding and /or producing the second language.
Grouping	Reordering or reclassifying and perhaps labeling the material to be learned based on common attributes.
Note-taking	writing down the main idea, important points, outline, or summary of information presented orally or in writing.
Deduction	Consciously applying rules to produce or understand the second language.
Recombination	Constructing a meaningful sentence or larger language sequenced by combining known elements in a new way.
Imagery	Relating new information to visual concepts in memory via familiar easily retrievable visualizations, phrases, or locations.
Auditory representation	Retention of the sound or similar sound for a word, phrase, or longer language sequence.
Key word	Remembering a new word in the second language by (1) identifying a familiar word in the first language that sounds like or otherwise resembles the new word, and (2) generating easily recalled images of some relationship with the new word.
Contextualization	Placing a word or phrase in a meaningful

	language sequence.
Elaboration	Relating new information to other concepts in memory.
Transfer	Using previously acquired linguistic and/or conceptual knowledge to facilitate a new language learning task.
Inferencing	Using available information to guess meanings of new items, predict outcomes, or fill in missing information.
Social /affective	
Cooperation	Working with one or more peers to obtain feedback, pool information, or model a language actively.
Question for clarification	Asking a teacher or other native speaker for repetition, paraphrasing, explanation and/ or examples.

Table 1: O'Malley and Chamot's typology of learning strategies (Chamot , 1987)

The classification scheme Oxford came up with (Oxford, 1985) was used as a basis for constructing a questionnaire on learning strategies. Focused on what O'Malley and Chamot call metacognitive strategies, Wenden's (1983) identifies three general categories of self-directing strategies: 1) knowledge about language 2) planning 3) self-evaluation. Wenden found that adult learners pose questions relating to each category and then take decisions depending on the kind of answers they come up with. Wenden's framework was devised as a basis for learner training (Ellis, 1994: 539). In Oxford (1990) presents a new taxonomy. A distinction is drawn between direct and indirect strategies. The former consist of "strategies that directly involve the target language" in the sense that they "require mental processing of the language" (1990: 37), while the latter 'provide indirect support

for language learning through focusing, planning, evaluating, seeking opportunities, control anxiety, increasing cooperation and empathy and other means" (1990: 151).

Considerable progress has been made in classifying learning strategies. The frameworks developed by O'Malley and Chamot, Wenden, and (in particular) Oxford, provide a basis for studying which strategies or combinations of strategies are effective in promoting learning.

2.5 Learning strategies and language learning

It has been the research focus whether and how these strategies affect learning outcome. Two approaches have been followed: experimental studies and correlational studies. The former is carried out to identify the strategies used by good language learners, while the latter is to investigate the relationship between vocabulary learning strategies and language learning outcomes by means of statistical procedures.

2.5.1 The "good language learner" studies

A number of researchers (Rubin, 1975; Naiman et al., 1978; Abraham & Vann, 1987; Naiman et al., 1978; Lennon, 1989; Pickett 1978) carried out studies to identify good language learners by interview or questionnaires in five major aspects of successful language learning, 1) a concern for active task approach 2) a concern for communication 3) an active task approach 4) an awareness of the learning process, and 5) a capacity to use strategies flexibly in accordance with task requirements. There is convincing evidence from the good language learner studies to show the following five characteristics of the good language learners.

Paying attention to the formal properties of the target language contributes to success.

Good language learners also attend to meaning.

Good learners actively get involved in language learning.

Good language learners are aware of the learning process.

Good language learners make use of metacognitive knowledge to help them assess their needs, evaluate progress, and control over their own learning.

(Ellis, 1994: 546-50)

Chamot et al. (1988), provides evidence in support of the final general characteristic of good language learners—flexible and appropriate use of learning strategies. However, what set the 'effective' students apart was their use of a greater range of strategies and , in particular, their ability to choose strategies that were appropriate for particular tasks. The effective learners were also more purposeful in their approach. Studying good language learners has proved a useful way of investigating how strategies affect language learning.

2.5.2 Correlational studies employing statistical procedures

A number of studies have sought to examine whether there are specific strategies that are statistically related to L2 proficiency.. Despite the unclear results obtained by these studies, they lend some support to the main findings of the 'good language learner' studies.

In a series of studies, (for example Bialystok, 1981; Politzer and McGroarty's, 1985) the attempt to show a statistical relationship between strategy use and proficiency was only partly successful. Mangubhai (1991) studied the strategies used by five adult beginner learners of L2 Hindi who received four weeks of instruction. The result shows that the "high" achievers used more memory strategies and practiced more than the "low" achievers.

2.6 Training learners in the use of vocabulary learning strategies

Strategies can be taught. Teachers should provide students with instructions and opportunities for practice with MS. There is now a wealth of material that has been developed to train learners to use effective language learning strategies (for example, Ellis & Sinclair 1989; Wenden 1986b &1991). Surprisingly, however, there have been few empirical studies that have attempted to evaluate the success of this training in the use of vocabulary learning strategies on L2 learners. We will briefly review the major studies and then identify the main key issues in vocabulary learning strategy training.

2.6.1 Studies of vocabulary –learning strategy training

Bialystok (1981) carried out two experiments to investigate a number of ways in

which the ability of Grade 10 students of L2 French to inference the meanings of words in a continuous text could be improved. However, dictionary use (but not picture cues) resulted in better scores on a vocabulary test while in the second experiment the strategy training proved less effective in promoting either comprehension or vocabulary acquisition.

Cohen and Aphek (1980) gave adult learners of L2 Hebrew a short training session in how to learn vocabulary through associations. The results indicated that forming associations helped in vocabulary recall tasks suggesting that training in forming associations might be most helpful for advanced rather than beginner learners.

A third study of the effects of strategy training on vocabulary learning failed to show significant results, but is interesting because it suggests the complexity of issues involved. O'Malley et al. (1985) studied the effects of two kinds of training on 75 intermediate-level ESL students of mixed ethnic backgrounds. His study shows that the learning styles of different cultural groups need to be taken into account in planning strategy training.

Research studies have also been carried out in China specifically on vocabulary learning strategies (Wu and Wang, 1998; Chen, 2001). It is also concluded that a wide range of vocabulary learning beliefs and strategies are related to both vocabulary size and general English proficiency. Two items under MS---self-initiation and selective attention---emerge as positive predictors of general proficiency. However, these studies in China are mostly concerned with students in some key universities. Up till now, few studies have been done on secondary students. So do secondary students apply the same vocabulary learning strategies as key university students? Therefore, the study of learning strategies used by secondary students seems to have some practical significance.

2.6.2 Main issues on vocabulary learning strategy training

Clearly, many issues need elaboration before strategy training can be implemented. First, more work is needed to discover what combinations of strategies should be taught. Second, learner's individual differences should be taken into account. Third, it is necessary to convince some learners that strategy training is worthwhile because the very learners who need strategy training are most likely to reject it. Fourth, it is not clear whether learner training will work best when it exists as a separate part in classroom setting or when it is

fully integrated into the language teaching materials, as proposed by O'Malley and Chamot (1990) in their Cognitive Academic Learning Approach (CALLA). A final issue is whether learners should be made conscious of the strategies they are taught, or whether just providing practice

2.7 Language learning strategy training model

Finding the usefulness of strategy training, some research tried to present a model including the steps to be taken by teachers for this kind of instruction (Oxford, 1990; O'Mally and Chamot, 1990)

O'Malley and Chamot (1990) found two approaches in teaching learning strategy---direct (overt in Oxford's model) and embedded (covert in Oxford's model). They recommended the use of a more direct approach for the instruction.

Later, Chamot and O'Malley (1990) working on a project called Cognitive Academic Language Learning Approach (CALLA) provided a useful framework for direct language learning strategies instruction. The sequence of instruction in CALLA approach is a five-phase recursive cycle for introducing, teaching, practicing, evaluating, and applying learning strategies. In this approach, highly explicit instruction in applying strategies to learning tasks is gradually faded so that students can begin to assume greater responsibility in selecting and applying appropriate learning strategies.

To have a successful and helpful learning strategy instruction some requirements must be met by the teachers. These are summarized by Oxford (1990) into the following principles:

1) L2 strategy training should be based clearly on students' attitudes, beliefs, and stated needs.
2) Strategies should be chosen so that they mesh with and support each other and so that they fit the requirements of the language task, the learners' goals, and the learners' style of learning.
3) Training should, if possible, be integrated into regular L2 activities over a long period of time rather than taught as a separate, short intervention.

4) Students should have plenty of opportunities for strategy training during language classes.
5) Strategy straining should include explanations, handouts, activities, brainstorming, and materials for reference and home study.
6) Affective issues such as anxiety, motivation, beliefs, and interests— all of which influence strategy choice—should be directly addressed by L2 strategy training.
7) Strategy training should be explicit, overt, and relevant and should provide plenty of practice with varied L2 tasks involving authentic materials.
8) Strategy training should not be solely tied to the class at hand; it should provide strategies that are transferable to future language tasks beyond a given class.
9) Strategy training should be somewhat individualized, as different students prefer or need certain strategies for particular tasks.
10) Strategy training should provide students with a mechanism to evaluate their own process and to evaluate the success of the training and the value of the strategies in multiple tasks.

Nevertheless, not all L2 strategy training studies have been successful or conclusive. Some training has been effective in various skill areas but not in others, even within the same study Therefore the present study was conducted to shed some light on this issue.

The writer of the present study will go on with the study to investigate whether Chinese secondary students will benefit from MSMM for vocabulary learning and what different reflections students may have about the instructions.

Chapter 3 Combination of metacognitive strategy and mind-mapping training

3.1 Theoretical foundation for mind-mapping

A good memory helps a learner acquire a language as soon as possible so the important aim of teaching is to help students remember what they have learned successfully or, more precisely, helping them store words in memory. In information processing, memorization is the process of encoding, storing and retrieving the input information. The input information is accepted in the stage of perception, and then enters short-term memory. Nevertheless, the input information will be forgotten without prompt repetition.

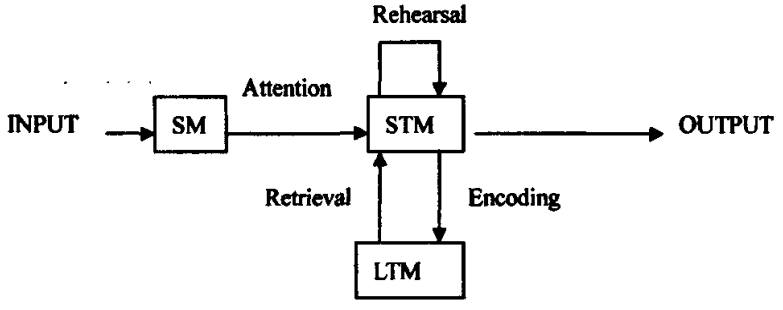

Figure 2 The Information-processing Model (Craik and Lockhart, 1972)

As the figure above indicates, there are 4 components in the processing of information: attention, rehearsal, encoding and retrieval.

1) The ability to pay attention is vital to memory because it is the process by which information is moved from sensory memory to short-term memory. Most of the information in sensory stores disappears very rapidly because it is not germane to our current goals. But the process of taking in new information, identifying it, and choosing whether to process it more extensively, although rapid, take a measurable amount of time.

So attention serves as the base for the information-processing.

2) Rehearsal involves working or doing something with new information. There are two types of rehearsal: maintenance rehearsal and elaborative rehearsal. The first type, the parrot-like repetition of items, does not cause any item to be transferred to long-term memory. Elaborative rehearsal, however, which involves taking the words and creating an elaboration of some sort, causes an enormous increase in subsequent recall. Through elaborative rehearsal the material seems to be transferred to long-term memory. The way we rehearse information influences the quality of our memory.

3) Encoding is the process of linking new information to existing knowledge in order to make it more meaningful. Information is thus transferred from short-term memory to long-term memory. Craik and Lockhart (1972) argued that memory depends on what learners do as they encode new information. That is to say, how we process to-be-remembered information makes a difference in how well we remember it. That is, the levels of processing decide the effects of memory. The deeper the level of processing encouraged by the question, the higher the level of recall achieved.

4) Retrieval is the process of moving information from long-term to short-term memory. Using a computer as a metaphor for memory, short-term phase is RAM (easily lost when something else enters) while long- term memory is the hard drive or disk (the information is there even after the machine is turned off). So it is essential that information placed into a student's long-term memory be linked in a way that the student can retrieve it later.

According to a dictionary on psychology, one of the most famous researchers on memory is Ebbinghaus. He wanted to find out the process of building associations in terms of memory. In order to control variables, he used meaningless syllables as materials for his investigation and later got some data (see table 1). Ebbinghaus drew a curve (see Graph 1) based on these data, which is famous as Ebbinghaus' forgetting curve. The vertical axis represents the amount of memory while the abscissa axis means the fixed time. The curve displays the change of the amount of memory. Then he found out that memory retention was a function of time: retention dramatically fell fast but gradually settled down, making a curve line. In a study first published in the late 19th century, Hermann Ebbinghaus (1993)

reported the rates of forgetting meaningless syllables. The statistics nicely illustrated the need for strategies to improve the memory of information.

Time interval	Amount of memory
Just finished remembering	100%
20 minutes later	58.2%
One hour later	44.2%
8-9 hours later	35.8%
One day later	33.7%
2 days later	27.8%
6 days later	25.4%
One month later	21.1%

Table 2 Ebbinghaus' experiment data on memory (Ebbinghaus, 1993)

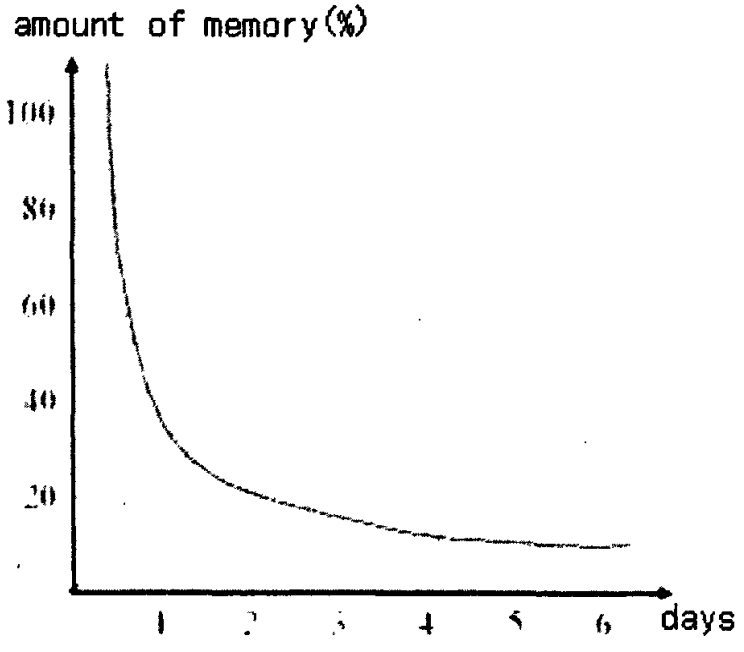

Figure 3 Hermann Ebbinghaus' Forgetting Curve (1885)

Ebbinghaus curve shows that forgetting is unbalanced, which is fast in the initial

stage, and later slows down. At last, after a long time, forgetting will not occur. Forgetting is very fast on the first day, of which 25 percent remains. After one week, the amount of vocabulary remembered drops off considerably. Later, the speed of forgetting slows down, and the amount of forgetting is less. Without constant reviews, most information will be lost from memory.

Also, in another study, Pimsleur (1971) demonstrated by examples and graphs that the probability of students' remembering the vocabulary items decreases rapidly shortly after initial learning occurs and that, if nothing is done to remedy this situation, the words will be completely lost eventually. However, if re-learning of the words can be arranged at appropriate intervals, retention will be improved, and forgetting will become slower. Again, the statistics illustrate the need for strategies to improve memory.

Time from first learning	Percentage of remembered	Percentage of forgotten
After 1 day	54%	46%
After 7 days	35%	65%
After 14 days	21%	79%
After 21 days	18%	82%
After 28 days	19%	81%
After 63 days	17%	83%

Table 3 Rates of Forgetting Vocabulary Items (Pimsleur, 1971)

3.2 Factors hindering and helping deep-processing

As the information-processing model and Ebbinghaus forgetting curve showed, information in the working memory may disappear unless consolidated. Therefore, some researchers have suggested that the amount of effort put into encoding a memory may affect how long it lasts and how easily we can retrieve it, and to reduce memory loss.-processing, they have studied the factors hindering and helping deep-processing.

Obviously, lack of attention or appropriate consolidation procedures would prevent

the effective encoding of information for retention and recall. Unsuccessful mnemonics result from cues that are difficult or confusing to remember. So, it may be an aid to take a glance at some of the ways of transferring short-term memory to long-term memory to reduce memory loss.

To transfer short-term memory into long-term memory, various connections or associations are involved between the new information and what we already know or understand. The association occurs because new information is tied to the piece of prior, familiar information or to a less difficult piece of information. Associations enhance the strength of memory traces and provide a structure for retrieval.

So what impress us most can be unforgettable. We have experienced a lot from childhood till now such as first love, the first kiss, the first prize at school all of which have left us a deep impression. Even if many years have passed, they still stay in our minds. If every single word can be made impressive and meaningful, memorization efficiency can be promoted and much time and energy can be spared. Then how can words be transferred to be impressive?

What we have experienced or what we have seen or heard are impressive. Pictures and images can hardly be forgotten. Something unknown, when connected with something already known can hardly be forgotten. For instance Mona Lisa's smile, a piece of touching music, may stay in our minds. For something abstract, if it is shifted to something audio-visual or more direct or concrete, then memory efficiency can be highly improved.

3.3 Advantages of mind-mapping

Mind-mapping is one of the simplest, yet most powerful, tools a person can have in her creativity toolbox. It is a non-linear way of organizing information and a technique that allows you to capture the natural flow of your ideas. Mind-mapping can be applied to personal, family, educational affairs, such as writing memo, preparing a meeting agenda, getting a bird eye view of a complex project. Here are some of the examples of the applications for mind-mapping.

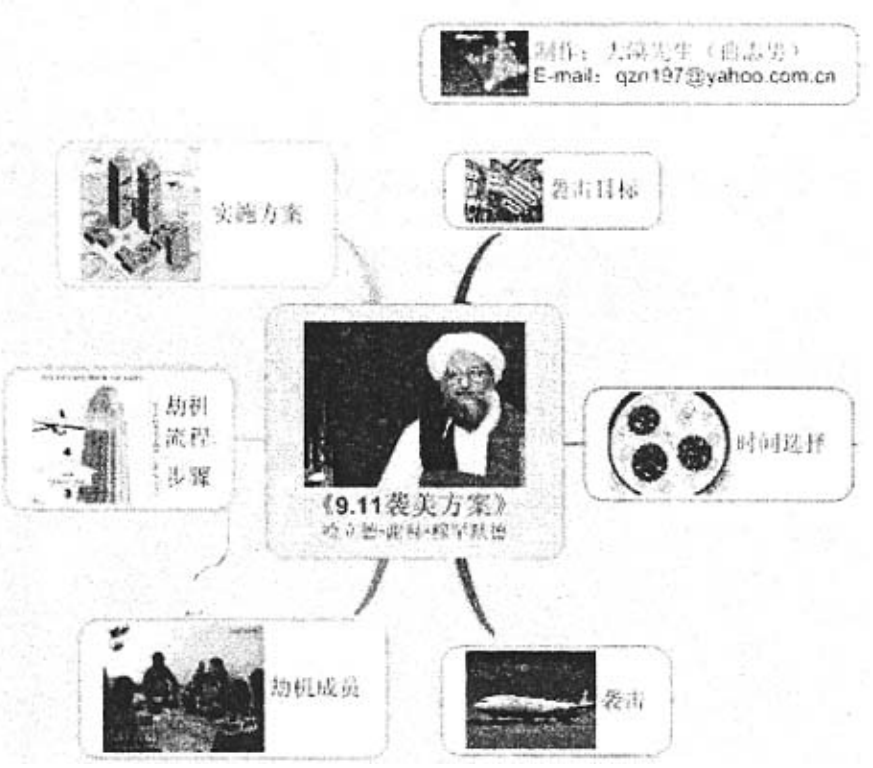

Figure 4 Design for 9.11 attack on the US (by Qu, 2006: 10)

The usual way of summarizing is to take a longitudinal view our thoughts, such as first, second, third, and fourth, all of which have little relationship or focus. Mind-mapping is somewhat unique in combining all the details—focus, relations between thoughts, and procedures of doing things, within one picture. (Figure 4)

Figure4-1 Steps

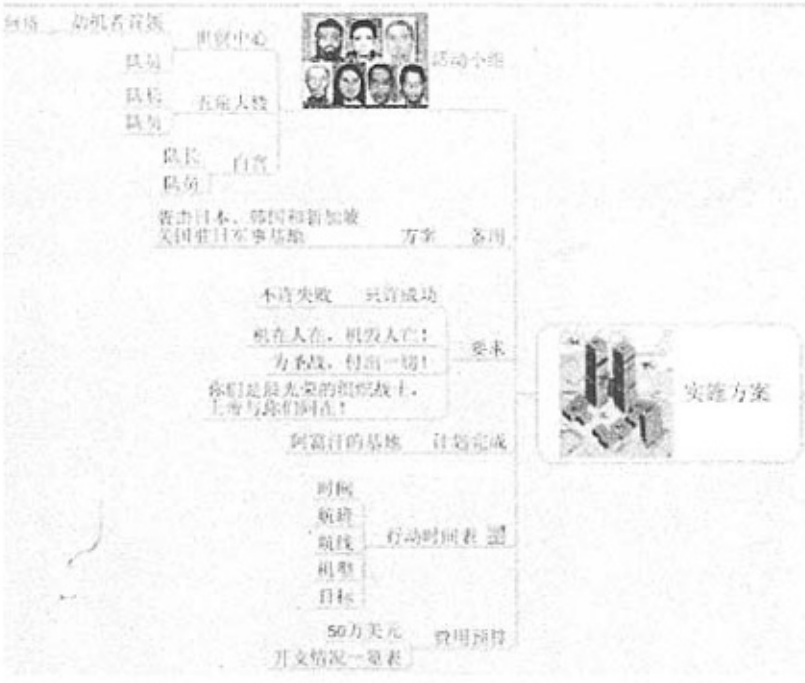

Figure4-2 Design

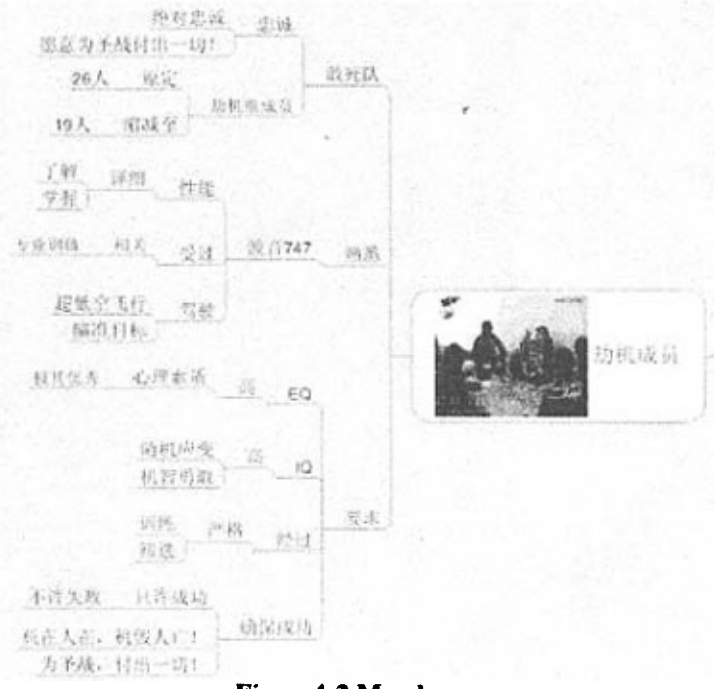

Figure4-3 Members

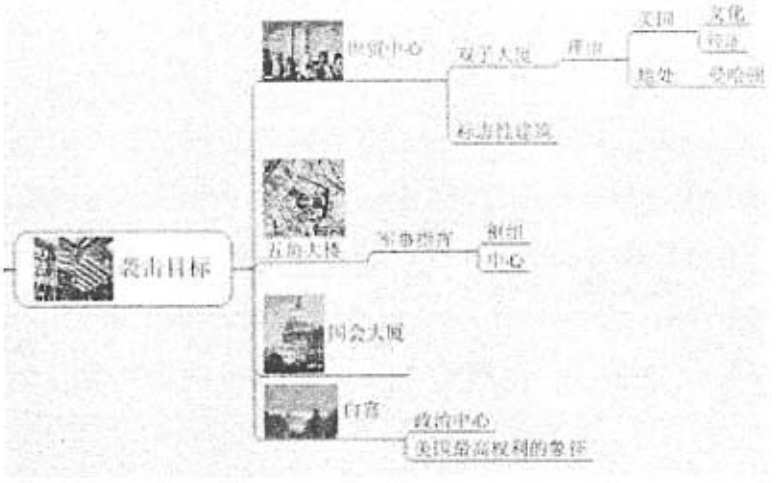

Figure4-4 Target

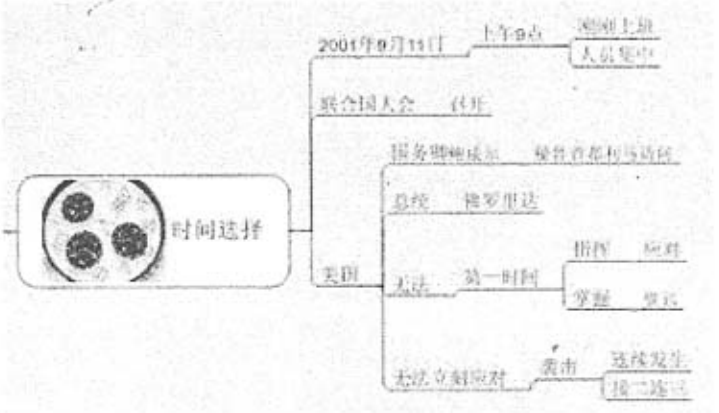

Figure4-5 Time

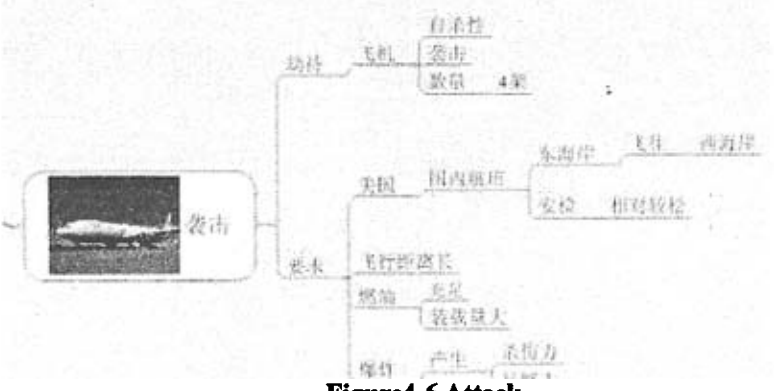

Figure4-6 Attack

On one hand, the whole thinking procedure can be presented. On the other, steps can be clarified so that the key points stand out. This advantage is even greater when faced

with various complex problems and needed to take quick decision.

Mind-mapping works for some people, who are very visually oriented. Real mind-mapping is full of clear pictures drawn or designed to summon up complex memories in the person. It is a powerful way to visually show the structure of thoughts and of human memory. (Figure 5)

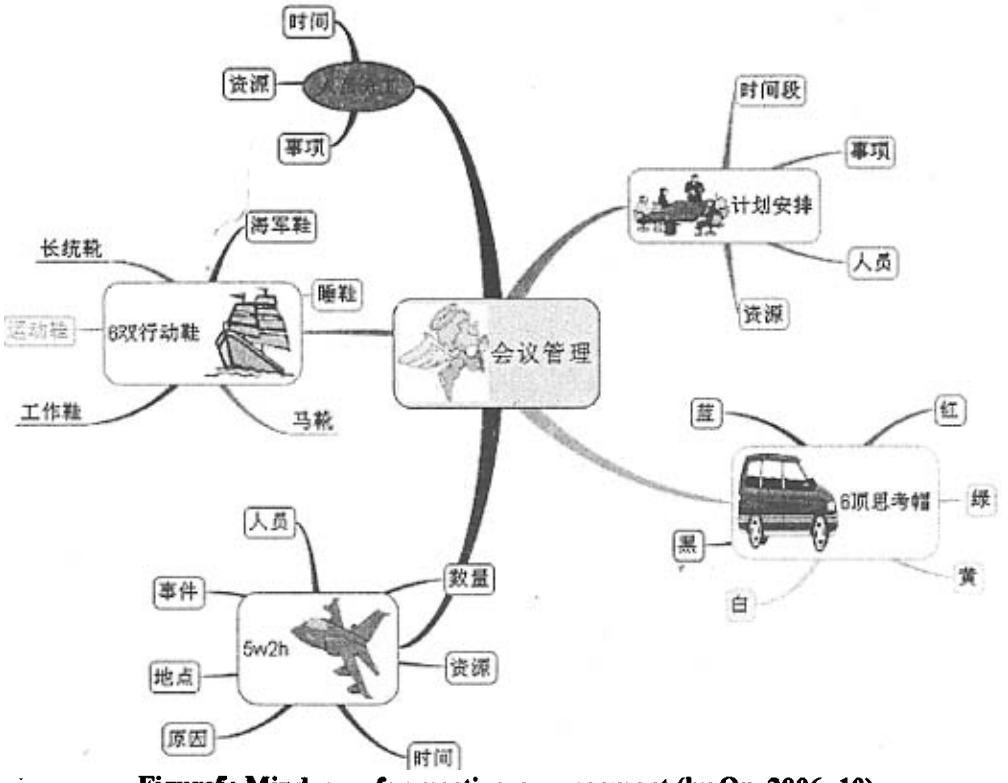

Figure5: Mind-map for meeting-arrangement (by Qu, 2006: 10)

Any useful tool, if it is made to take effect, must put into practice. After being exposed to mind-mapping, the learners are left to their own devices to try to imagine how to apply mind-mapping to the applications in other fields. Software and technique research have concluded that managers and students find the techniques of mind-mapping to be fun and advantageous.

The software designed by New Mind Education Company is intended to help English learners memorize 2000 English words effectively. L2 learners need help developing a large sight vocabulary so that they may automatically access word meaning.

However, which words should be focused on: high frequency words or difficult ones? There is support for both approaches. Learning the 2,000 most frequent words in English can be very productive. Analyzing one text for young native speakers and another for native speakers on the secondary level, Nation (1990) found that 87 percent of the words were on the high frequency list. The teaching of such word lists through paired-associates learning, often seen as a more traditional way to acquire vocabulary, has nonetheless proven to be a successful way to learn a large number of words in a short period and retain them over time. In fact, learners are capable of acquiring a list of anywhere from 30-100 L2 words with their L1 equivalents in an hour and remember them for weeks afterwards (Nation, 1982, 1990). In the years ahead, technology will undoubtedly aid students in mastering this list. Coady et al. (1993) experimented with computer-assisted learning of the 2,000 most –frequent words in English and concluded that using computers to learn the list was an efficient use of time and that emphasizing the list was valuable because it resulted in higher reading proficiency.

So is it the same with situations in China? English has a vocabulary of around 550,000, but words are not of the same importance. Among them 100 words are high-frequency words from the same test paper for dozens or thousands of times. We may compare them to Golden words because they make up as high as 58.83% of written English. 400 words are Silver words making up 23.32% of written English. The number of Bronze words is 500 which making up 7.56% while 1000 Iron words make up 5.67% of written English. All the 4 kinds of words add up to 2000, making up 95.28 of written English. The other 548,000 only make up 4.72% of written English so the value of one Golden word is equal to that of 2500 ordinary words. The 2000 words are the basic words including Gold, Silver, Bronze and Iron words (李, 2006). Then how are the 2000 words selected?

To pick out the 2000 basic words, experts and scientists have made great efforts in searching thousands of reading materials for the frequently used words on computer. Here is the result after analyzing the NCEE English test papers for 2005, 2006 based on the 2000 basic words.

Province	Total words	Basic words coverage	Non-basic words
Shanxi	3011	96.7%	3.3%
Beijing	3218	95.1%	4.9%
Henan	2684	96.24%	3.76%
Anhui	2536	96.93.%	3.07%
National	3323	96.3%	3.7%
Hunan	3677	95.2%	4.8%
Fujian	3594	94.1%	5.9%
Chongqing	3694	97.8%	2.2%
Hubei	3654	96.37%	3.63%

Table 4 The analysis on NCEE in 2005, 2006

(NCEE=National College Entrance Examination)

So the 2000 basic words cover around 96% of any NECC test paper. These words serve as the backbone of a strong animal without which the animal can never survive while the non-basic words are like the millions of hairs of the animal. Without hundreds of hairs, it makes no difference to the animal. If students' attention is directed to basic and the most frequently used words at the very beginning of English learning, much time and energy will be saved.

Mind-mapping, simply speaking, is a picture in mind. For each word, mind-mapping has created a flash picture combining its pronunciation, spelling and meaning. Thanks to multi-media technology, each word goes with a picture. It has such a great impact on sight, hearing and mind that high efficiency can be achieved. Take the word 'design' for example. Usually we memorize the word letter by letter. After a careful study of the word, however, we may find that the word can be divided into three parts: d-e-sign. If we connect the letter 'd' with Chinese 弟弟, 'e' with 鹅; 'sign' is familiar to us which means"符号，记号." Then we will find it is a word consisting of three interesting parts rather than six abstract letters. Finally we join the three parts together by visualizing it in a specific situation. The

three parts are connected and hooked in such a way that we quickly memorize it. Whenever we recall it, the situation 弟弟正在教一只鹅设计符号 will come easily to our minds. This method has the advantage of being fun and consequently, memorable.

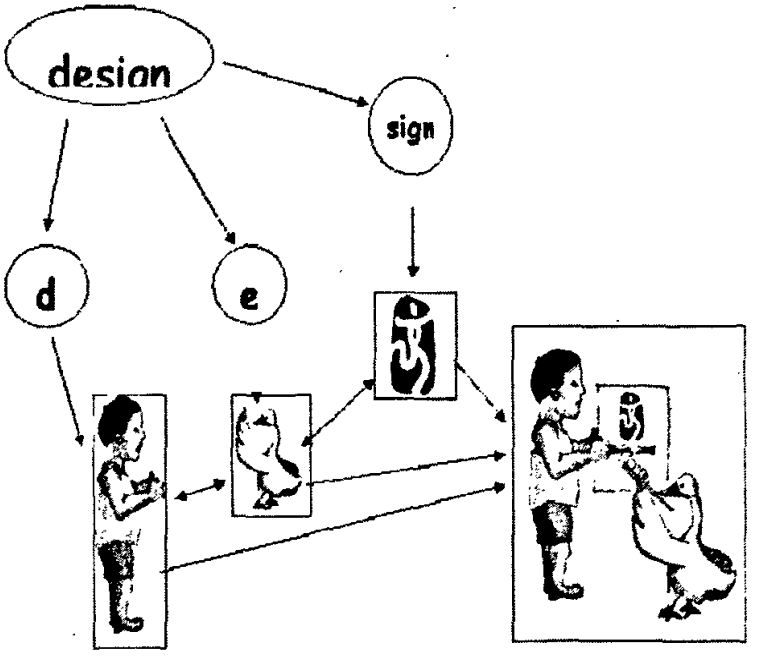

Figure 6: Example of mind-mapping (Adopted from www.chinamemory.com)

It is believed that one's left brain is in charge of inferring, analyzing, calculating while our right brain is in charge of sounds, pictures, arts, literature. If two brains work together memorization can be improved by 20 times. Take the word phenomenon for example, because it is a long word, we find it hard to spell. If we study the word carefully and try to divide it into several parts p-hen-o-men-on and join them up this way "剥了皮的母鸡蛋砸在男人头上，这种现象太少见了。" Although the association sounds ridiculous and funny the word is transferred to be vivid, impressive and hence memorable. For a word with more than one meaning, for example, 'swallow'(v.吞咽，n.燕子) it is displayed as "蛇爬过墙洞张大嘴吞吃燕子". As the flash picture is on, its pronunciation is stressed. Therefore the word' s pronunciation, spelling, and meaning can be memorized.

Mind-mapping is supposed to be highly effective because it involves many factors

including pronunciation, spelling, meaning, sound and picture. Students with the help of mind-mapping don't have to bother themselves to think twice which strategy should be used for every single word. The whole process can be made great fun, convenient, competitive and consequently memorable. When students are enjoying, clicking, testing, and memorizing. In spite of the fact that two of the cognitive skills ---semantic map and learning through reading are not mentioned in the process of memorizing single words, extensive reading in the latter stage of English learning will enable students to present and organize new words in terms of their interrelated lexical meanings. As a result, vocabulary can no longer be thought of as separate items, but become an integral part of discourse and be developed along with reading strategies such as contextual guessing.

To conclude, mind-mapping has a set of memorizing strategies with which almost every word can be decoded. After a short period of training every learner can develop an autonomous learning ability. In short, mind-mapping leads to a mental revolution in English learning. Memorization with highest efficiency is no longer the top of the pyramid. It is within everyone's reach.

3.4 Metacognitive strategies

3.4.1 Metacognition

To use metacognitive strategies successfully in the process of English teaching and to prepare students to be able to use them effectively, teachers must have a clear idea of metacognitive theory.

What is metacognition? Metacognition was first advanced by American psychologist Flavell (1979) in the 1970s. Flavell pointed that it had usually been broadly and rather loosely defined as any knowledge or cognitive activity that takes as its object, or regulates, any aspect of any cognitive enterprise. It was called metacognition because its core meaning was "cognition about cognition" (Flavell, 1985: 104).

It turns out difficult to define MS partly because of a confusing term –skill. The distinction had better be made between skill and strategy. Learning strategies are conceived of as operating at a level above skills; they can be seen as the executive processes that

manage and co-ordinate skills. So for example, guessing the meaning of a word or planning a task is a skill, but the learner has to be able to use it in a purposeful way when appropriate. In other words, strategies are purposeful and goal-oriented. Nisbet and Shucksmith (1986:5-6) explain the distinction by using an analogy of a football game. A player possesses a range of skills, such as how to pass the ball to another player. However, to succeed in a football match he has to know when to use these skills and how to put them together. Thus, he uses tactics to co-ordinate them. In order to employ a good tactic, he has to be aware of other things that are going on around him, to choose the appropriate strategy for the particular moment, and to monitor whether it is successful. We shall, therefore, prefer, the term "strategies" here to skills. As a matter of fact, without individual vocabulary learning skills, MS can never exist. With MS training, individual learning skills can be best coordinated. Therefore, the best effect can be achieved.

The use of MS is to a large extent determined by the user's level of metacognitive knowledge. According to Wenden (1987: 574), there are three types of metacognitive knowledge: knowledge about person involves everything that one believes about himself--one's personal attributes and preferred style of learning, knowledge about what one knows and does not know and what one can and cannot do, and an awareness of one's progress. Knowledge about task refers to an awareness of the purpose and demands of the task, as well as an ability to assess the information provided, and to select what is relevant from what is irrelevant. Knowledge about strategy involves an understanding of which strategies should be used for different types of tasks as well as a general knowledge about learning languages.

3.4.2 Classification of metacognitive strategies

There have been several attempts at categorizing MS. O'Malley and Chamot (1990) claims that MS involve thinking about the learning process, planning for learning, monitoring of comprehension or production while it is taking place, and self-evaluation after the learning activity has been completed. Oxford (1990: 20) has also developed a somewhat different system of categorizing MS. While containing most of the features of previous classifications, it is more detailed. In Oxford's system, MS can be broadly classified into three groups: (1) centering your learning; (2) arranging and planning your

learning; (3) evaluating your learning.

These three groups of MS are further divided into 11sets. Oxford has offered us a more detailed and feasible classification of MS. Since we will base our instruction on this system, a detailed description is necessary. First, let us talk about the three groups of MS one by one. The first group includes the following strategies:

(a) Over-viewing and linking with already known material means previewing the basic principles and /or material (including new vocabulary) for an upcoming language activity, and linking these with what the learners already know.

(b) Paying attention involves two modes, direct attention and selective attention. Directed attention means deciding generally or globally to pay attention to the task and avoid irrelevant distractions. In contrast, selective attention involves deciding in advance to notice particular details.

(c) Delaying speech production to focus on listening relates to listening and speaking rather than reading and writing.

There are altogether six strategies for arranging and planning your learning:

(a) Finding out about language learning means uncovering what is involved in language learning.

(b) Organizing includes a variety of tools, such as creating the best possible environment, scheduling well, and keeping a language notebook.

(c) Setting goals and objectives means that before the learner sets out to carry out a learning task, he should have a clear idea of his aim, otherwise he may stray and waste his time and energy.

(d) Identifying the purpose of a language task involves determining the task purpose.

(e) Planning for a language task identifies the general nature of the task, the specific requirements of the task, the resources available within the learner, and the need for further aids.

(f) Seeking practice opportunities indicates that the language learner must seek out or create opportunities to practice any or all of the five language skills. Classroom time can never provide adequate practice for a foreign language learner, which requires him to find or create additional chances to practice the language. The teacher should

make it clear to his students that it is up to them to generate their own opportunities to practice instead of waiting for the teacher to offer them the chance. Good learners are likely to pay attention to any materials written in English, such as names or imported commodities, and the English instructions on the packing box, etc.(Oxford, 1994).Shallower activities may be more suitable for beginners, because they contain less material which may only distract a novice, while intermediate or advanced learners can benefit from the context usually included in deeper activities

(Cohen and Aphek, 1981)

The two strategies in the third group relate to monitoring one's own errors and evaluation one's overall progress.

(a) Self-monitoring requires learners to notice and correct their own errors in any of the language skills. They should be encouraged to write down their most significant difficulties in their language learning notebooks and try to eliminate them. Error analysis can often help them to avoid repeating the mistake and gradually improve their master of the new language or understand more about their own use of learning strategies. Efficient readers often skim or scan, make guesses about what will come next, and correct any misinterpretations as they move ahead.

(b) Self-evaluating helps learners to keep an eye on their progress. After a language task, learners are expected to evaluate their performance. And the result of evaluation should be recorded in their notebook to display their progress rate. Of course, to make the evaluation more accurate, learner must take into consideration the difficulty of the situation or the language. As applied to vocabulary learning self-evaluating might consist of learners' assessing their proficiency in a variety of ways.

（Oxford, 1994）

In China, Wen (1996) proposes her own framework for Chinese EFL learners. She put forward a system consisting of two major parts: beliefs and strategies. Beliefs are conceptions and knowledge that learners hold toward English and English learning. They include management beliefs and language learning beliefs. Management beliefs refer to

students' ideas of setting goals, planning, strategy choosing, and self-management etc. Language learning beliefs refer to students' ideas of the best ways to acquire English, including knowledge and skill of English and communication ability. These beliefs are relatively stable and may influence the learner's approach to learn English. Strategies refer to regulation of learning process, and they are further divided into management strategies and language learning strategies. Management strategies involve how to set goals, choose learning strategies, arrange study time, evaluate strategy using as well as accordingly make adjustment. Language learning strategies are those strategies used to deal with special tasks.

In Wen's (1996) opinion, there' s no distinction between "good" and "bad" strategies; the efficiency of using them is decided by whether learners can use them appropriately. A successful learner is one who can find and apply most suitable language learning strategies for himself and effectiveness of English learning is influenced by language learning beliefs and management strategies (Wen, 1996: 62).

3.4.3 The constraints on metacognitive strategy application

A number of factors are assumed to affect the types, numbers and frequency of the use of MS. As to students of the same cultural background, MS are mainly influenced by learner's proficiency in the target language, task requirements, learner's individual differences such as attitude, motivation, age, personality, gender, general learning style, aptitude, etc..

In reviewing the effect of different factors on the development of learning strategies, Oxford and Nyikos (1989) conclude that motivation appears to correlate best with strategy use, and that increased motivation and self-esteem lead to more effective use of appropriate strategies and vice versa. So during strategy training, the teacher should try every means to motivate his students so as to ensure the smooth development of students' use of MS.

3.5 The advantages of combination of mind-mapping and metacognitive strategies training

One of the best ways to motivate students is to encourage them and provide them with

opportunities to experience success. Mind-mapping makes it possible for learners to memorize the 2000 basic words in the shortest time. It has the following advantages:

1) Repetition: It is the direct means of vocabulary learning. Using this method, one only has to repeat the word again and again without thinking about any specific skill. According to the information processing theory, this method involves shallow processing and can be considered as a mechanical way of memorization. However, each word draws a learner's attention in the form of a picture at the first sight of it. Instead of being parrot-like repetition, each picture conveys an elaborative meaning which causes enormous increase in later recall. Elaborative rehearsal is far superior to maintenance rehearsal. Above all, it is great fun enjoying the pictures once again.

2) Revision: Through testing themselves, learners are encouraged rather than forced to revise the target word. Learners may skip those which have already been memorized and for those troubled words learners may take a look at the picture which would soon remind them of the meaning as well as the spelling. It only takes a few seconds. By revising and consolidating a great number of words during the shortest time short-term memory is transferred into long-term memory in a natural way. In other words, a large amount of words can be memorized before the learners feel tired.

3) Pictures or imagery: Research shows that mental creativity has a powerful effect in memory. Usually, the livelier the imagery of the word is, the more easily the word can be memorized by the learner. By mind-mapping, interactive images are associated with vivid personal experience which transfers mentally the target word to effective memory. Rather than merely recycle the spelling words over and over, mind-mapping breaks them into components and elaborates the to-be-remembered information in the way that learners can see or imagine it. By using associations of various kinds, a certain picture may stay alive in learners' minds.

4) Related words: New words can be linked to L2 words which the student already knows. Because this involves some type of sense relationship, such as coordination, synonymy or antonym, hyponymy, the sensory stores take in a variety of colors, tones, tastes and smells that we experience each day. The stronger relation a word has with what the learner is familiar with, the longer it is stored in the learner's memory.

5) Grouping: Words are recalled better if organized in the way of belonging to each meaning category, or in a form of pattern, or in a story chain. Hence, learners are encouraged to imagine successive stories to connect the single words together. The narrative chain method has been shown to be highly effective with L1 undergraduates, who recalled six to seven times as many words with this method than with rote memorization (Bower and Clark, 1969).

6) Word formation: Study of how words are made up will help students to work out the meanings of unfamiliar words. Many newly coined words can be easily understood through their use of affixes. Knowing about the patterns of affixation can also help students to have at least a receptive knowledge of several words at the cost of one. The students who know the word translate can certainly understand, and also probably invent such words as mistranslate, retranslate, untranslatable, translator, co-translator, translation, and mistranslation.

Mind-mapping involves cognitive strategies which are seen as mental processes directly concerned with the processing of information in order to learn, that is, obtaining, storage, retrieval or use of information. MS however, involve an awareness of one's own mental processes and an ability to reflect on how one learns, in other words, knowing about one's knowing. It is like learners stepping outside their learning and looking at it from outside. It is generally believed that effective achievement of a cognitive task is to a large extent determined by students' monitoring and evaluating their cognitive activity, or by metacognitive experience. Metacognition is different from cognitive psychology in that learners are far from passive in their learning; rather, they are actively involved in making sense of the tasks or problems. Without individual cognitive strategies, MS can never exist. With MS training, individual learning strategies can be coordinated best. Therefore, the best effect can be achieved.

An approach, however effective, cannot solve all the problems in classroom language teaching. Abraham and Vann (1987) studied the strategies of unsuccessful language on a variety of different kinds of tasks and found that what distinguished unsuccessful learners was not the lack of appropriate strategies but the inability to choose the right strategy for the task. The unsuccessful learners in their study appear to be active

strategy-users, but they often failed to apply strategies appropriately to the task at hand. Apparently, they lacked certain necessary higher-order processes, what are often called metacognitive strategies, or self-regulatory skills.

MS are used by students to control and evaluate their own learning, by having an overview of the learning process in general. They are generally broad strategies, concerned with more efficient learning. Students without metacognitive approaches are essentially learners without direction. Developing metacognitive awareness in learners may also lead to the development of stronger cognitive skills and much deeper processing. It results in critical but healthy reflection and evaluation of thinking.

Cognitive strategies, on the other hand, are often specific to distinct learning activities and would include using operations or steps in learning or problem-solving that require direct analysis, transformation or synthesis of learning strategy. Examples of cognitive strategies are inferencing, or guessing meaning from context, and elaboration, or relating new information to other concepts in memory. They both are involved in the information process actively.

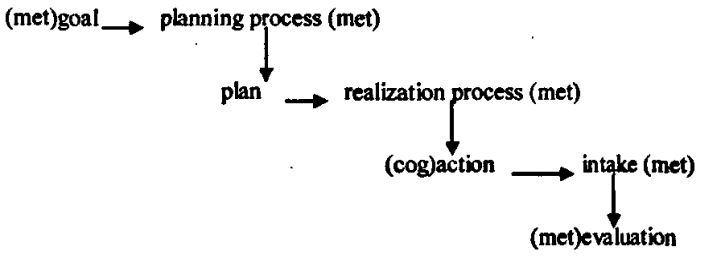

Figure 7:Combination of metacognitive strategies and cognitive strategies

Flavell thought, metacognitive knowledge plays a very important role in relevant knowledge concerning language use activity. He describes metacognitive to be the understanding that how oneself studies; knowledge of achieving the goal and how to use the obtained information; ability to judge cognitive demand of a certain task; to use what kind of strategies according to which purpose; and accessing one's own progressive both when achieving the process or after finishing the task.

The metacognitive ability has already had two aspects which are confirmed, they are: cognition of the cognitive，regulation and control of cognition. First of all, the cognition of the cognitive refers to the compatible knowledge between one's owns cognitive resource and the concrete learning conditions. It is made up of three parts: (1) Statement knowledge; (2) Procedural knowledge; (3) Conditional knowledge. Statement knowledge is the knowledge about the fact of itself, It explains the question "what", including learner's understanding of one's own or factors which influenced learning, such as the knowledge of cognitive process. Procedural knowledge means to carry on the knowledge of different cognitive activities, such as using a certain strategy. Conditional knowledge explains "why", and including the reason and when to adopt and use certain strategies. In brief, the cognition of the cognitive is that while finishing studying the task, the learner regard one's own study activity as the cognitive target, obtain knowledge to the factor influencing learning process through introspection, etc. and act on this kind of knowledge during the learning process.

The second cognitive aspect of metacognitive-regulation and control of cognitive, is

that in the whole process of learning, the learners regard ones' own current activity of learning as the consciousness target, and constantly regulate, control and access it consciously. Regulation refers to that choosing the suitable strategies or assigns the influencing resources of learning activity properly. For example, conducting prediction and concentrating attention before the learning begins. Monitoring means that examines ones own study behavior closely and adjusts the learning process consciously. Replying oneself usually is a very good example. Accessing is examining the result and efficiency of ones learning, including the diagnosis of the question and re-reorganization of the goal and achievement.

It is obvious that, two cognitive aspects of metacognitive are closely linked to each other. As a deep cognitive activity, metacognitive is learner's self- control of learning process; the knowledge or ability of adopting the strategic action on efficiently organizing and arranging learning activity; and using the concrete method in the process of learning. In the process of learning a foreign language, the learners' metacognitive knowledge is the self-recognition and self-retrospect of how to learn this language well according to ones own conditions. If the learners understand clearly how to study effectively, then they may adopt the effective step to meet the demand of leaning; On the contrary, if they have no idea of their own limitation or the complexity of the study task as the language learners, then it is very difficult for them to take the precautions or the revising measure to predict or overcome the problems.

So, it is extremely important to understand that MS is significant in foreign language learning but MS cannot be treated in isolation. In order to fulfill teaching tasks more successfully, MS must involve approach dealing with integral relations of several major pedagogical factors. Without cognitive strategies MS can never exist. Cognitive strategies serve as the base or foundation for MS while MS regulate and monitor cognitive strategies. Researchers in MS and cognitive strategies indicated that much of the reported failure of learning strategies transfer to new task can be attributed to failure of combining metacognitive information with a cognitive approach to learning strategies. Thus, the study on how best to combine them in vocabulary strategy instruction is significant and advantageous.

Chapter 4 Methodology

In this chapter, firstly, the questions in the thesis was provided and the hypothesis of the research was put forward if MSMM could facilitate senior Grade One students' vocabulary learning and retention. Secondly, the subjects involved in the research were described with the corresponding reasons for choosing them. Thirdly, instrument to use in the whole course of research was shown, and the questionnaire and the vocabulary tests were explained in more detail.

After that, the whole process of the experimental procedure was illustrated. The perceptions of strategy instruction was also described. The writer designed and carried out the research in the hope that the strategies of the research could be applied for vocabulary instruction in all senior high school students.

4.1 Hypothesis

MSMM has a positive impact on L2 vocabulary of senior high school students, i.e. the positive relationship exists between combination of MSMM and L2 vocabulary acquisition, and it is significant and necessary to assume strategy instruction in teaching activities and English vocabulary acquisition. The questions are as follows:

1) Is there a positive relation between combination of MSMM instruction and their English vocabulary size among Senior One students?

2) Does Explicit training effectively improve Chinese students' English vocabulary learning?

4.2 Subjects

The subjects for this research were sampled from YueHua Senior High School, which was a private school in Dezhou. The 100 students (48 females and 52 males) came from 2 classes randomly selected out of the total 7 paralleled classes of Senior One. The

reasons for choosing them as the research subjects were: 1) These students after at least more than 3 years of English study had a command of basic English, but many of them faced various difficulties in English learning due to limited vocabulary. 2) A number of students did not adapt quickly to the new teaching style in Senior High School because they used to be too dependent upon teachers' instructions in class in Junior High School. 3) Despite poor autonomous learning ability, students were willing and enthusiastic to cooperate, hoping they could make a brand new start in the new environment.

4.3 Instrumentation

For the whole senior one students in YueHua School, a questionnaire (cf. Appendix I) on vocabulary MS was given. Then the first vocabulary test was given to both experimental group and control group. After that, for experimental group, the subjects were introduced to MSMM instruction while control group received their usual instruction in which the writer wrote on the blackboard the target words and their meanings and let students make up a sentence by using it and memorize the words in a way they thought was best to memorize these words. Finally, a second vocabulary test was given for both groups and the results were processed by SPSS.

The purpose of the questionnaire was to investigate MS students were already using and to develop their metacognitive awareness of the relationship between their own mental process and effective learning. The design of the questionnaires was based on O'Malley and Chamot's (1990) classification of learning strategies and Senior English Curriculum Standard and changed slightly considering students' mental and psychological features of this period. The title was the questionnaire on the vocabulary learning MS among Senior One students. The Vocabulary Learning Metacognitive Strategy Questionnaire, written in Chinese, consisted of two parts. The first part contains 6 items to investigate the beliefs of Senior One students' vocabulary learning with the second part concerning the subjects' differences on specific MS use, all of which shared the same five choices: A. This statement is never true of me B. This statement is seldom true of me C. This statement is sometimes true of me D. This statement is often true of me E. This statement is always true

of me. A mean score above 3 indicates high frequency in the use of the corresponding strategy while a mean score below 3 represents low frequency. Overall reliability of the questionnaire is high at .92.by using the Statistics Package for Social Science (SPSS 11.5) after pretest .As far as the validity of the questionnaire is concerned, it can be guaranteed for the following reasons. First, the questionnaire was adapted from Gu and Johnson's work, taking Senior High English Curriculum Standard into consideration that enjoyed a relatively high validity since it reflects previous quantitative and qualitative research in this field. Second, the adapted questionnaires were constructed under the guidance of psychology experts. The finished questionnaire was carefully checked and polished. Therefore, when it was finally presented to the experts, both the structure validity and content validity of the present questionnaire were considered reasonable.

The questionnaire was given to Senior One in YueHua Middle School, the number of whom is 378, at the beginning of the first semester. In September, 2006, 368 copies of the questionnaire were distributed to the Senior One students and collected after students finished it. The total number of valid copies collected was 365. Then descriptive statistics was obtained to summarize the overall patterns of MS used by these students and feedback was got.

variable	Items	No.	M	SD
Beliefs	1.hope for vocabulary learning strategy instruction	365	3.48	0.83
	2.wish to improve vocabulary learning efficiency	365	3.38	0.88
	3.believe that vocabulary is important in English learning	365	3.62	0.98
	4.find it great difficulty with vocabulary learning	365	3.56	1.30
	5.main source for vocabulary is extensive reading	365	1.53	0.69
	6.read English magazines, newspapers to enlarge vocabulary	365	2.62	1.05
	1.make simple weekly or monthly plans for vocabulary	365	2.03	0.82
	2.regular review either after class or within one day	365	2.57	0.99
	3.look for any possible ways of memorizing words suitable	365	2.60	1.12
	4.use several methods together to memorize words	365	3.16	1.04

Metacognitive Strategies	5.share experience often with classmates or teachers	365	2.22	0.93
	6.reflect often on your own progress or errors	365	2.35	0.91
	7.know how to get help when in trouble	365	3.40	0.95
	8.participate in various out-of-classroom activities for practice	365	1.93	0.91
	9.look for or create chance to learn English	365	1.53	0.69
	10.take a positive attitude towards English and grow confident	365	2.53	1.22
N=the number of students M=means SD=standard Difference				

Table 5 Statistics on vocabulary MS questionnaire on Senior One students in YueHua Middle School

According to the results in this table, 76.8% of the students hope that they can get training for vocabulary learning strategies, and this means that they lack effective learning strategies because of all the 10 MS items, only 2 items have 'means' higher than 3. Besides, they seldom consciously enlarge their vocabulary by reading more materials outside the classroom, looking for or creating chances to learn English, participating in out-of –classroom activities. 83% of the students use textbooks as their main way to learn words, which indicates that the students are too dependent on teachers. What is more, the mean score for MS use is rather low (M=2.43). In spite of their awareness of the great importance of vocabulary learning in English studies, students are still making little use of MS such as plan-making, self-monitoring and self-evaluation. The statistics showed that students' ability of autonomous strategy use need improving. So far they have not formed the good habit of vocabulary learning.

As for some specific strategy use, some problems do exist of which the following strategies should be paid much attention to.

1) Making plan for vocabulary learning. The mean score for this item is 2.03. Through interviews with students we learn that 48.7% of the students never make plans. A large portion of the students have not realized the importance of making plans. Nor have

they learned how to make or carry out their plan.

2) Looking for or creating chances to learn English. The mean score for this item is 1.53. Through interviews with English teachers we learn that most of the students remain passive in classroom and that they let go the chances to practice, let alone grasp more opportunities outside classrooms.

3) Share experience with teachers and classmates. The mean score for this item is 2.22. By further investigation we learn that 47% of the students are too shy to do so while 24% would rather rely on themselves to correct errors than cooperate with others.

Thereupon, a T-test was performed to examine the differences in vocabulary size between two classes before strategy instruction. Finally a correlation analysis was made to determine how various strategies were related to vocabulary size test.

Vocabulary tests consisted a pretest, and a posttest. Vocabulary learning involves a gradual increase in the learners' vocabulary size. In order to test the subjects' word level, a pretest was given to the students to serve as a baseline. The writer chose 100 words from the 2000 basic words.(cf. Appendix II) After 2-month computer-assisted learning by mind-mapping and 3-month-metacognitive strategy instruction, the author chose 100 words from the textbooks as well as the reading materials the subjects had covered as a posttest in the end. The words in the posttest were not concluded in the first 2000 basic words. The subjects managed to memorize by themselves with aid from the teacher. The post vocabulary test (cf. Appendix III) was designed to investigate if MS instruction could enhance vocabulary learning. The scale of difficulty for the two vocabulary tests was designed to increase each time. For pretest, the author asked the students to provide a Chinese equivalent. For posttest, the students were asked to work on a variety of exercises including writing English definition, a synonym, antonym or paraphrasing the words given, or to complete a passage choosing the proper words.

4.4 Experimental procedure

Both experimental and control groups attended an English course which lasted for 5 months (45minutes a day, five days a week). The author would teach both classes. Both

groups would receive the usual training. Only the experimental class received explicit instruction on MS at the beginning of the course. 15 minutes for each class was spent on MS instruction.

4.4.1 Preparation

The purpose of this phase was to motivate the students by identifying their strategies, analyzing their potentials, developing their metacognitive awareness and set their own goals by self-management.

As is shown in the information-processing model, attention is very important in learning. If a learner wants to memorize some materials, they must pay great attention. Children can write out a list of words many times without learning them, a child can practice some aspects of writing skills without improving his penmanship; and a child may do a series of exercises by following the steps indicated in the example without mastering the principles involved. That is why some learners often complain that they have recited the words for many times but cannot remember them. The reason is not that they are stupid, but that they do not pay attention to the words. The best way for them is to cherish a positive attitude toward learning. Teachers should arouse their learning interests and let them consider learning to be a good chance to acquire knowledge rather than a boring and passive task. They can often organize some activities, which make word-memorization easier and more interesting because learning is effective if it is interesting and meaningful to learners.

Here are some of the effective ways to motivate students:

1) Telling them the necessity of learning English and acquiring a large amount of vocabulary
2) Helping them to identify the strategies they are already using and to develop their metacognitive awareness of the relationship between their own mental processes and effective learning.
3) Giving them a 10-minute short vocabulary test after simple training and helping them regain confidence in language learning.

Kangaroo	扛着一只袋鼠进房间，没门	kang+a+roo (m)
Lobster	106 号街上的人专吃龙虾	lob+st(reet)+er

Swan	天鹅四万一只	s+wan
Lettuce	让兔子给嫦娥送生菜	let+tu+c(hang) +e
Mutton	牧羊人能吃掉十吨羊肉	mu+t+ton
Bamboo	爸爸出门看见 600 棵竹子	ba+m+boo
Scar	蛇被小汽车刮了伤痕	s+car
Swear	蛇诅咒发誓不穿衣服	s+wear
Scream	蛇一吃冰淇淋就尖叫	s+cream
Fashion	发现时尚，赶紧跟上	fa+shi+on
Swallow	蛇爬过墙洞露出牙齿要吞掉燕子	s+wall+o+w
Flood	洪水把食物和木棒冲到一起	food+l
Molecule	馍乐了，醋乐了，分子单词记住了	mo+le+cu+le
Scold	蛇一冷就骂人	s+cold
Lolly	上 101 中学的李咏拿着棒棒糖	lol+ly
Magic	妈妈的九张 IC 卡是有魔力的	ma+g+ic
Educate	两鹅堵着一猫说："我们要教育你。"	e+du+cat+e
Buddha	不要像弟弟那样在佛像前哈哈大笑	bu+dd+ha
Chess	车上的两条蛇在下象棋。	che+ss
Hippo Hi,	屁屁圆的是河马	Hi+pp+o

4) Helping them to set specific goals for mastering the 2000 basic words by mind-mapping and then the vocabulary from certain chapters in the textbook within a certain time frame, and to plan their time in order to accomplish the task.

4.4.2 Presentation

This phase focused on modeling the learning strategy. The teacher first introduced the theory of coordination between human's left and right brain, Ebbinghaus Curve, the encoding of letters or letter groups. A great number of examples were given as demonstration. During this phase students' cognitive awareness developed. Then the teacher talked about the characteristics, usefulness, and applications of the MS explicitly through examples. Learners were explicitly taught the variety of strategies to use when they encountered a vocabulary word in a text or they judged the word to be important to

the overall meaning of the text. More importantly, students received explicit instruction on how to use these strategies. They were told that no single vocabulary learning strategy would work in every case. The preparation and planning, the selection of vocabulary learning strategies, monitoring of strategy selection and use, orchestrated use of several strategies, and evaluation of the effectiveness of MS for vocabulary learning would be illustrated through several examples.

Learning to learn words is just as important as learning words. No matter how rich the vocabulary instruction is, students still must learn most words independently. As we have seen, a significant proportion of new vocabulary words are acquired through incidental encounter with words in reading. Reading provides a rich context for learning vocabulary. According to Nation (1990), "the strategy is just a means of acquiring the unconscious skill that an efficient reader already has." He assembles the steps as follows:

- Look at the unknown word and decide its part of speech. Is it a noun, a verb, an adjective, or an adverb?
- Look at the clause or sentence containing the unknown word.
- Look at the relationship between the clause and sentence containing the unknown word and other sentences or paragraphs.
- Use the knowledge you have gained from the above to guess the meaning of the word.

(Nation, 1990)

Here were some of the suggested activities together with examples given to the students

(a)He is kind and good. We appreciate his kindness and goodness.

(adj.) (adj.) (noun.) (noun.)

Schools educate children. They provide education.

(verb.) (noun.)

There is dirt on the floor. The floor is dirty.

(noun.) (adj.)

He is careful. He works carefully.

(adj.) (adj.)

(b) A transcontinental train is a train that goes across a continent.

Substandard quality is quality that is below standard.

To reheat something is to heat it again.

A prehistoric animal is an animal that lived before history began.

A machine that malfunctions is a machine that functions poorly.

(c) Their new helper is very dependable. (depend, dependable, dependably)

Everyone admires goodness and beauty. (beauty, beautiful, beautifully)

When do they collect the mail? (collect, collection, collective)

He has completed the work satisfactorily. (satisfaction, satisfactory, satisfactorily)

(d) A person who is ungrateful is not grateful.

An inconvenient time is a time that is not convenient.

An irregular heartbeat is one that is not regular.

In the next phase the teacher wrote similar sentences which could help students relate new words such as cruelty, generosity, poverty, necessity, arrival, choice, incomplete, indefinite, illiterate to the forms they already know cruel, generous, poor, necessary, arrive, choose, complete, definite, literate.

1) Examples related to grouping (adopted from Bower at el., 1969) Mention three topics that could be used for grouping (all the topics should make used of the students' own experience). Later in the phase of practice, more exercises would be done on grouping.

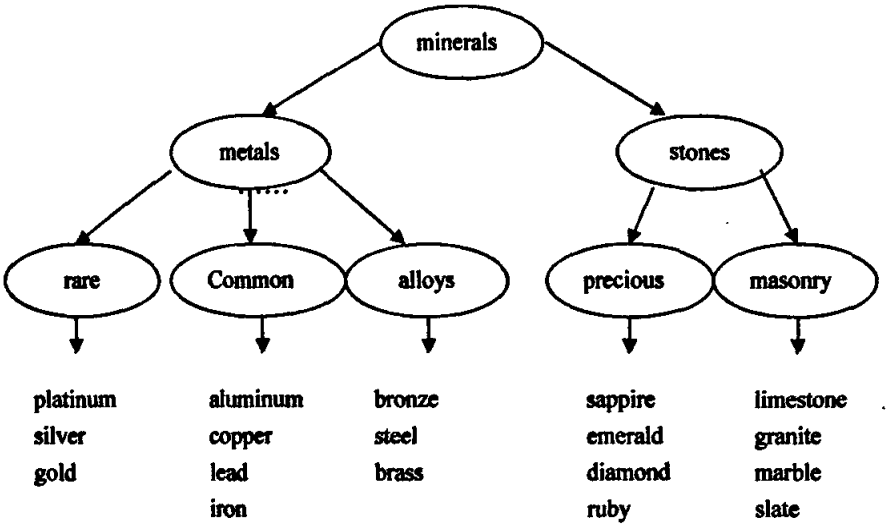

Figure 8: A Conceptual Hierarchy of Words for the Word Minerals

(Adopted from Bower at el., 1969)

!) Examples of word-guessing from contextual clues

(a) Without anesthetic, the patient had to suffer from great pain during the operation (common sense)

(b) John disliked his roommate, therefore, everything the guy did infuriated him. (experience clues)

(c) Tom was lazy but his brother was diligent (comparison-contrast clues)

(d) The team yelled, jumped, shrieked, and turned cartwheels. Such animation was rarely seen in that school. (synonym clues)

(e) Chad refused to do homework. He lacked respect for teachers. He was always disobedient. Finally, disciplinary action had to be taken by the principal. (summary clues)

(f) After studying the front and sides of the new gym building, she walked to the back of the edifice (association clues)

(g) The rapidity with which he moved across the room, quickly reached the lock, and flung open the door indicated his agility. (mood or situation clues)

(h) Her action symbolized peace. The reader here recalls previous statements such as "the dove symbolizes peace, or the scales symbolize justice." (previous contact clues)

3) an example to help decide which words in a reading passage should be looked up in the dictionary and which ones need only be understood.

Television Programs

Often eight more people are needed to create a television program. Each carefully prepares for his part in the show, and he knows his job well. The day for the filming finally arrives. The set is finished at last. It is cleared of all except the actors, the card boys, and those who operate the cameras and sound booms. All of the actors arrive early in the morning to practice the program once more.

Students read a passage and then answer questions:

a) In your opinion, which of the underlined words in that passage will students probably not need to use in their own speech or writing? List those words, and write "For comprehension" above the list.

b) In your opinion, which of the following paired words would be more important to learn? Which word needs to be looked up in the dictionary?

Cameras or sound booms? Finished or cleared? Card boys or actors? Arrive or operate?

(Virginia French Allen, 1983: 115-16)

In the latter phase, students are given more passages with unknown words. They have to think twice which to look up before they pick up the dictionary. It is wise to begin with passages with a few unknown words. Once the students have formed the habit of looking for familiar elements within longer unfamiliar sentences, they will go on to discover the implied meaning from the context.

4.4.3 Practice

In this phase, students had the opportunity of practicing the learning strategies with an authentic learning task. They would be asked to make conscious effort using MSMM. The students, by the computer's assistance, quickly accumulated 2000 basic words as

start-up vocabulary. They practiced monitoring while using multiple strategies available to them. The students would become aware of multiple strategies after a lot of practice, for example, how to use both word analysis and contextual clues to determine the meaning of an unfamiliar word. Students would be shown how to recognize when one strategy wasn't working and how to move on to another.

Here were some possible ways used in practice:

(1) The first two months was for students to memorize 2000 basic words by mind-mapping with computer assistance. The number of the words to be memorized depended on the student's individual proficiency level ranging from 40-80 a day. The students tested themselves on computer before they set their own goals. Through this step, the students could memorize the basic 2000 words as well as become familiar with cognitive techniques in memorization.

(2) For the next two months, four days was set as a unit of instruction and practice. Students were asked to memorize the words in each unit. A variety of exercises were given related to the words, including grouping, guessing the meaning from context, completing the sentence using the proper form of the words, translation, paraphrasing, matching words with the similar meaning, semantic mapping. After being encountered many times, words formed many connections in students mind. Then students were asked to review them at once in class. After class, the teacher arranged the reciting homework in time, asking them to remember the new words by using different strategies. They managed to use a cluster of vocabulary learning strategies to help themselves. In the next class, a dictation of the new words was given before reading the text, and then questions related to the text were asked so as to consolidate the context in which the words appeared. The third day was mainly for reading comprehension. On the fourth day, the review class was arranged, asking the students to review what they had learned in the unit, and to check if they could use what they had learned including the words, sentence pattern, or grammar flexibly in language communication. By using this method, students could grasp the new words through deeper and deeper processing.

Here was a perfect example: in order to supervise and urge students to memorize new words every day, each student was asked to set a goal for himself. Every student had a

pocket notebook in which the new words he learned each day were jogged down. The new words were mostly the ones they learned in the text that day. Students brought their notebooks with them and looked through them three times a day. Each time cost them 5 minutes to review the words.

(3) For the last month, free and extensive reading was proposed. The students were given some source of reading materials to choose from such as the Students Times, 21st century, bookworms. Some other reading materials were recommended to the students. But those who were quicker in reading might have their own choices. Another goal needed to be set by the students about how many passages to read per day, how many new words to memorize per day and how to achieve the goal. In this period, the students tried to manage their own vocabulary learning through context by using MS with the teacher's supervision.

4.4.4 Evaluation

The main purpose of this phase was to provide students with opportunities to evaluate their own success in using learning strategies, thus developing their metacognitive awareness of their own learning process. Activities used to develop students' self-evaluation insights included self-questioning, debriefing discussions after strategies practice, learning logs in which students recorded the results of their learning strategies application, checklists of strategies used, and open-ended questionnaires in which students expressed their own opinions about the usefulness of particular strategies.

Here were some specific methods the writer attempted:

1) Determining the particular task details in advance:

The teacher made the students clear of what they had known and what they had not known. In order to do so, students were asked to write down "what I have learned" and "what I want to learn". In this way students were trained to improve their selective attention.

2) Sharing thoughts with each other:

The students were encouraged to tell their thought to each other or to the rest of the class. The teacher tried to make students aware of the possibilities of group work for vocabulary learning. Then students were encouraged to play the role of a teacher to demonstrate, to discuss while the teacher evaluated their work by giving comments. Thus

the unobservable thinking procedure turned observable by sharing thought in a group.

3) Keeping learning journals:

Students were required to write journals during their learning process. The journals covered the content that had been learned, the problems they had encountered, the strategies they felt good in using. They may write down a) What made me puzzled? b) What were the unknown? c) What strategies would I use? The teacher was responsible for looking through their journals, solving their problems and positively affirm their progress.

4) Planning and regulating:

Students should be taught how to make plans for preview, reflection. When students had learned how to do so, they were given a free hand in planning and regulating.

5) Self-assessing:

The student learned to make self-assessment before, during or after the completion of the task, which referred to self-planning, self-regulating and self-evaluating. With the teacher's help students made a plan, arranged the time, solved problems, adjusted their learning and analyzed the causes. The learning procedure followed the route as planning—monitoring—assessing and replanning — remonitoring — reassessing which ascended for each cycle.

During this phase, the teacher's task was to study both the cognitive strategies and MS, and then get to know the students' demand. Finally the teacher had to tell them a) What to learn; b) Why it is worth learning; c) When to use the strategies; d) How to use these strategies.

4.4.5 Expansion

In the final phase, students would be encouraged to (1) use the strategies that they found most effective; (2) apply these strategies to new contexts, and (3) devise their own individual combination and interpretations of metacognitive learning strategies. They would be asked to consider not only vocabulary learning but also other domains of language learning.

A skilled student uses strategies, and with practice the strategies become nearly automatic. However, throughout the semester, in order to sustain students' awareness, they would be periodically asked whether they used the strategies and if they found them useful.

The use of strategies was also systematically reinforced by the teacher. Moreover, in teaching new vocabulary items the teacher would make the students aware of the importance of using MS in combination with other learning strategies. Students could do this by asking questions about the strategies they used to learn new vocabulary items.

At the end of the course both the control group and the experimental group would be given the vocabulary test and the results of the tests would be compared to find the effects of the training.

4.5 Data collection and analysis

The questionnaire was administered during class time and the response rate was 100 %. The subjects were given about 20 minutes to finish the questionnaires. All the questionnaires were collected by the set time. When the students were working on the questionnaires the teacher helped them with one or two statements when they didn't understand. On the whole, there were no big problems of understanding. The first vocabulary size test was administered immediately after the questionnaire was filled. Both questionnaire and pre-vocabulary size test were administered before the MS instruction. Then, after five months, both the experimental group and control group were given the post vocabulary test and a comparison between EC and CC for both pretest and posttest was obtained (cf. Appendix IV).

The author analyzed the data collected, and obtained descriptive statistics first to see the overall pattern of MS on vocabulary learning used by the whole senior one students, and then T-tests were employed to compare the means of vocabulary test for both experimental class and control class. Finally, correlation analysis was performed to see the variations of strategies related to vocabulary size and the effects of MSMM instruction.

Chapter 5 Results and Discussion

In this chapter Paired Samples statistics and correlations were given for two vocabulary tests which indicated the differences in the achievement of the students' vocabulary learning between experimental class and control class. Then results for students' journals for strategy use were presented.

5.1 Paired T-test for strategy use

Because the two sample classes were both from normal distribution, it was possible that T-test could be done. The results of applying the F-value were used to show whether the F-value is significant at the .05. Mean comparisons were made to examine whether there were differences in the achievement of the students' vocabulary learning between the experimental and control classes as a result of treatment.

Suppose H0:ò1²=ò2²

Sbig²=14.875², Ssmall²=13.283²

F=Sbig²/Ssmall²

=14.875²/13.283²

=1.254

consult F table, a=0.05, df=50−49, F0.05/2 (49,49)≈1.8

F=1.254<1.8= F0.05/2 (49,49), that is, accept hypothesis H0:ò1²=ò2²,

The two sample classes were of homogeneity of variance. Then T-test was performed as follows:

T-Test

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	ECFVT	41.92	50	14.875	2.104
	CCFVT	42.06	50	13.283	1.878

Table 6 Paired Samples Statistics

		N	Correlation	Sig.
Pair 1	ECFVT & CCFVT	50	.283	.046

Table 7 Paired Samples Correlations

Table 8 Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
Pair 1	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
ECFVT-CCFVT	-.14	16.904	2.391	-4.94	4.66	-.059	49	.954

From the statistics above, we could find sig=0.954>0.05,that is, before metacognitive strategy instruction there was no significant difference between the two classes indicating that they were parallel classes.

The statistics for the posttest after MS instruction could be seen as follows.

T-Test

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	ECSVT	64.96	50	12.426	1.757
	CCSVT	45.66	50	13.260	1.875

Table 9 Paired Samples Statistics

		N	Correlation	Sig.
Pair 1	ECSVT & CCSVT	50	.212	.140

Table 10 Paired Samples Correlations

	Paired Differences					t	df	Sig. (2-tailed)
Pair 1	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
ECSVT - CCSVT	19.30	16.140	2.283	14.71	23.89	8.455	49	.000

Table 11 Paired Samples Test

From the figures in the above tables, sig =0.000<0.01, that is, the difference between the two classes was significant. Scores in experimental class were much higher than control class. There existed a positive relation between the strategy instruction and English vocabulary learning. Thus the explicit MSMM instruction seemed to have contributed to the improvement of students' vocabulary learning. In other words, a compound teaching mode of teacher-facilitated, student-centered classroom work combined with computer-assisted autonomous learning outperformed the traditional, single and teacher-centered instruction. The results supported those of some previous studies on strategy instruction done by Zhang (2005: 49).

5.2 Perceptions of strategy instruction

In the present study, subjects were required to keep learning journals to write down

what they have learned from each session of the vocabulary strategy instruction and their perceptions toward the instruction. Results of the learning journals were presented as follows.

In terms of what the subjects have learned from the instruction of MSMM, their responses included the following items:

1) Some methods which were not used before, 2) Learning how to classify and discuss 3) Learning how to analyze a word (e.g. prefix) and 4) Recognize a word from hints, 5) Catching key words and spelling, vocabularies and sentences, grammar, 6) How to think and memorize, 7) Guessing words,

Furthermore, with respect to subjects' perceived differences after receiving the strategy instruction, their responses included the following items: 1) It makes no differences. 2) Make a little progress. 3) There is sort of improvement, but if we can't find our own learning methods, we can't make much progress. 4) Have a better understanding of using strategies to learn vocabulary. 5) Understand the content easily. 6) Know some methods of learning words. 7) Have more confidence. 8) Understand English easily. 9) Have better ability to memorize. 10) Understand the keywords. 11) Know how to guess. 12) Change the thoughts and attitudes toward English. 13) Employ more learning strategies to practice.

As for subjects' perceptions toward the usefulness of MSMM instruction, their responses include the following items:

1) It does not change at all. 2) It helps less because we do not use often. 3) I know more ways to learn English. 4) I can find my own learning methods. 5) I can memorize easily. 6) Some materials can be understood. 7) The strategies are quite good. 8) It helps if you relax and imagine; then you can understand more. 9) It helps me to learn English by experts' advice. 10) I can make use of what I have learned to judge the meaning of new words. 11) I can analyze the characteristics of English and make English learning easier. 12) It can increase the chances of learning. 13) We will have goals for learning. 14) If we follow the strategies, we should make progress.

Finally, the suggestions for teaching MS proposed by the subjects include the following items. 1) Students need more practice. 2) The teachers can introduce contents

more clearly and give more examples. 3) Group discussion can be used. 4) To teach slowly is much better. 5) The teacher can review the MS. 6) The teacher can continue using this method in class. 7) Instruction time is not enough. 8) To provide regular tests is better.

5.3 Discussion

In the current research, results indicated that there was significant difference in the subjects' use of MS. That is, subjects employed significantly more strategies after they received the instruction of MSMM. The results supported those of some previous studies on strategy instruction. For example, O'Malley et al. (1985) indicated that strategy training can be effective on integrative language tasks for ESL students. Thus, the present study has confirmed the facilitating effect of strategy instruction on the use of MS.

As for the influence of strategy training on the use of individual vocabulary learning strategy, some findings were discussed below. First, results show that there is significant increase of strategy use for the memory strategies 'using imagery' and 'semantic mapping.' The present study found that subjects' use of some cognitive strategies did increase significantly after the computer-assisted mind-mapping' learning since they were more concrete and visualized in nature and thus can be taught more easily and effectively especially for the subjects who were low learners in proficiency. But several subjects noted in their learning journals that sometimes they would get the word images confused since it was too fast for them to learn more than 50 words every day. Therefore, learner's individual differences should be taken into account. This finding was consistent with Fan Lin's which revealed that learner's individual differences is a very important factor that has an impact on classroom teaching and it is demonstrated that only by complying with the learners' cognitive styles and directing them properly can the students learn effectively (Fan, 2002: 83-84).

Besides, the current study confirmed the point that English teaching should not only be confined to vocabulary size but expanded to emphasize on mastering 1000-2000 productive words (Dong, 2007: 49). Thus sufficient vocabulary exercises should be integrated with strategy instruction.

In addition, the present study indicated that subjects used significantly more social and affective strategies on cooperating with others after they received MS training. As a result, their anxiety was lowered and self-confidence grew. This finding is consistent with Nakata's (1999) who revealed that the effect of strategy training was more obvious on perception than on comprehension, especially for learners of low proficiency. It is suggested that MS instruction can make Senior One students have more positive perception toward the task of learning vocabulary.

Finally, the current research confirmed the positive effect of keeping learning journals on using MS. It corroborated with studies focused on a variety of ways to get the first class material, such as observation, investigation, interview, homework analysis, tests, questionnaires and learning journals so as to avoid subjective assumption (Fan, 2002: 83-84).

Chapter 6 Conclusion

6.1 Summary of the thesis

Based on the previous statistics and analysis, the writer had the following findings: 1) The model of combination of MSMM instruction was feasible in the vocabulary learning for Chinese Senior learners. 2) This training model improved students' metacognitive and cognitive vocabulary strategy awareness; 3) Direct and explicit explanation of MS should be integrated with sufficient proper exercises. The findings were consistent with Pan Liping's research (Pan, 2006: 49).

The current study proposes that systematic MSMM instruction result in the improvement of strategy use for Senior One students. The present research can provide the following contributions: to investigate the effect of strategy instruction on vocabulary learning, to provide process-oriented descriptions for the research literature of MS training, and with instructional implication to teach students how to employ effective vocabulary learning strategies and instructional procedures to perform the strategies in classroom teaching. Consequently, the students should be not only exposed to a large number of words but also taught how to memorize and how to use.

6.2 Limitations and further research

The study proposes that a combination of MSMM instruction result in achievement of vocabulary learning. Nevertheless, the study is somewhat limited for its comparative narrow range.

First, the number of the subjects is rather small. Due to time and energy, the study's scope is rather limited to only one senior private high school. Do students in other schools have similar or the same learning attitudes and beliefs or do they apply the same vocabulary learning strategies as the subjects in this study? With more subjects taking part in the investigation and more time spending in both public schools and private schools as

well as the consequent comparison and contrast between the two categories of the schools, the results of the study will be more complete and convincing.

Second, some important variables in terms of individual learner differences such as personal background, situational and social factors, and sex were excluded because of the limited time.

Third, though mind-mapping has the advantage of being fast, easily understood by students, the disadvantages are that most translation pairs are not exact equivalents, so that some erroneous knowledge may be transferred.

Last but not least, the study of vocabulary-learning strategies is a promising area of enquiry (Ellis, 1994: 554). According to O'Malley and Chamot (1990) there is need to develop the field of learning strategy research. So the present study is merely an attempt of enquiry in this area. Therefore, there is a long way in the research and exploration of vocabulary learning strategy instruction and much needs to be done.

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http://www.naotu.com

http://www.chinamemory.com

http://www. 思维导图. com

Appendix I

高一英语学习调控策略调查问卷

请根据自己的实际情况选择：

a.总是使用 b.经常使用 c.有时使用 d.很少使用 e.从不使用

Part 1

1. 是否希望得到词汇学习策略训练。
2. 是否希望老师改变教学方法，提高词汇教学效率。
3. 是否认为词汇在英语学习中很重要。
4. 是否认为词汇学习在英语学习中困难很大
5. 学习词汇的主要来源是否是大量阅读。
6. 是否主动阅读英文报刊，杂志，以扩大词汇量。

Part 2

1. 能根据需要制定简单的词汇周，月学习计划。
2. 课后或当天立即回忆复习单词。
3. 积极探索适合自己的单词记忆方法。
4. 利用关键词法，构词法，分类法等记忆单词。
5. 经常与老师和同学交流学习体会。
6. 注意了解和反思自己学习英语中的进步和不足
7. 我在学习英语中遇到困难时知道如何获得帮助。
8. 积极参与课内外各种英语学习活动。尽量通过多种渠道学习英语。
9. 我善于创造和把握英语学习的机会
10. 对英语和英语学习有积极的态度。逐步树立学习英语的信心。

Appendix II

高一英语词汇测试(pretest)

（请写出下列单词的汉语意思）

1.castle	2.cigarette	3.dislike
4.ahead	5.permission	6.smelly
7.bear	8.typewriter	9.share
10.tower	11.male	12.hardly
13.sign	14.tobacco	15.club
16.cartoon	17.smoker	18.manage
19.garage	20.packet	21.type
22.mouse	23.nation	24.composition
25.unsuccessful	26.habit	27.handshake
28.character	29.persuade	30.wave
31.studio	32.chance	33.nod
34.operate	35.reduce	36.agreement
37.strict	38.compare	39.gesture
40.beard	41.therefore	42.kiss
43.imagine	44.remain	45.custom
46.view	47.ban	48.proud
49.button	50.public	51.manner
52.heat	53.nitotine	54.distance
55.magic	56.drug	57.communicate
58.carriage	59.cancer	60.comfortable
61.host	62.guest	63.latest
64.fist	65.publish	66.juice
67.edition	68.daily	69.section

70.rose	71.besides	72.journalist
73.suitable	74.editor	75.rewrite
76.advertisemen	77.direct	78.headline
79.comedy	80.check	81.line
82.interview	83.particular	84.magazine
85.actress	86.chief	87.act
88.event	89.intend	90.fix
91.lifetime	92.immediately	93.swing
94.develop	95.silent	96.hand
97.add	98.deliver	99.rail
100.speed		

Appendix III

高一英语词汇测试(Posttest)

1.superb a. interesting b. excellent c. supperlike

2.escape a. run away b. hide c. jump over

3.experience a. try b. see and feel c. expert

4.slopes a. top of the mountain b.sides of the mountains c. foot of the mountain

5.harmless a. dangerous b. safe c. harmful

6.residents a. visitors b. inhabitants c. presidents

7.eyewitness a. someone who has seen an eye
b. someone who has studied an event
c. someone who has good eyesight

8.ruins a. new buildings b. damaged buildings c. raindrops

9.accurately a. without any mistakes b. accordingly c. currently

10.possibility a. reliability b. necessity c. chance that something might happen

11.fatal a. facial b. lucky c. can cause death

12.affect a. change or influence b. effect c. inject

13.concern a. something you think is important b. consider c. comfort

14.approach a. go away b. leave a place because it is not safe
c. move close to

15.forecaster a. someone who casts a fishing net in advance
b. someone who predicts the weather
c. someone who expects a good weather

16.coastal a. by the sea b. by the boat c. by the roast

17.several a. ever since b. for ever c. a few

18.evacuate a. leave a place because it is not safe

b. show thanks to c. evaluate

19.stare a. speak very quietly b. look directly at something for a long time c. glare

20.drought a. a large amount of something

b. a long period of time without rain c. a loud noise

21. roar a. make a loud, high cry b. shoot with a loud noise

c. a very loud noise

22.scream a. without movement b. speak in a loud voice

c. a very loud noise

23.tear a. pull strongly at something b. cry because of fear c. open

24.pile a. pole b. pilot c. a large amount of something

25.still a. till b. without movement c. yet

26.whisper a. speak in a low voice b. give a whistle c. use the whip

27.slam a. shoot with a loud noise b. slap the face c. little sheep

28.embarrassing a. walking out at night you see something white coming closer

b. you are going to talk to all the school

c. people laugh when you fall off your chair

29.avoid a. the team captain tells the team they are playing well

b. you see Tony and stand behind a tree

c. you must tell your father you have broken two windows

30.punishment a. Let me carry that for you b. My team lost ,0-3.

c. Stay behind after class.

31.Over 20 scientists have been ____medals for their outstanding contribution to physics.

a. returned b. awarded c. granted d. given

31.Students should be encouraged to _____the real causes of mysterious phenomena.

a. look b. invent c. discover d. find

33.The child's behavior shows that she is well_____.

a. bred b. grown c. fed d. raised

34.He has a _____that wearing hats leads to baldness.

a. thinking b. finding c. system d. theory

35.What did your friend do to _____his living?

a. get b. make c. take d. win

36..sailors must know how to tie these a. knots b. scarf c. necklace

37. the opposite of simple a. easy b. sample c. complex

38.money people pay to the government a. governor b. taxes c. salary

39.big bags a. sacks b. tubes c. containers

40.the study of lines, angles and shapes

a. geometry b. geography c. psychology

41.small metal objects which can hold together pieces of wood or metal

a. screws b. nails c. sharpener

42. exactly a. accurately b. especially c. actively

43.containers a. jars b. handbags c. wallets

44.making something dirty and dangerous a. population b. popular

c. pollution

45.behaviour that is against the law a. crime b. criminal c. illegal

46.Don't be too d_____ if things sometimes go wrong.

47.Don't w_____ life lying in bed on Saturday morning.

48.If your last grade was a D, work for C. Try to make p_____ bit by bit.

49.Eric is so u_____ after failing a test that he cannot eat or sleep.

50.Try to be i_____ in things at school and join in lots of activities.

51.When someone is m_____, no one knows where he is.

52.When you pour something, you move l_____ from one container to another.

53.When water is s_____, it is called ice.

54.When we call someone a giant, we mean he is very t_____.

55.When two substances do not r_____, nothing happens.

56.When we b_____, we take in oxygen.

57.Brussels is the c_____ of the European Union.

58.Dutch, French and English are the o_____ languages.

59.Spain is s_____ on the east of Portugul.

60. He has had a number of o_____: a farmer, a factory worker and a bridge designer.

61.We don't have the right _____(equipment, explanation) to do that experiment.

62.Our _____(conclusion, experiment) was that the chemical became heavier.

63.Many _____(metals, gases) are colourless.

64.Let's test the _____(contract, substance) to see what it is.

65.The correct _____(experiment, explanation) is that the gas gets hotter.

66.Most _____(metals, methods) react with acid.

67.Our _____(crucibles, results) were not very clear.

68._____(Three-fifths, Two-thirds) of 60% of the ice melted.

69. The distance between rural and _____(urban, mountain) areas is narrowing.

70. We live _____(across, opposite), so we often go to school on foot.

Complete the passage using the right word from the following:

I.

agriculture education encourage fewer health

poor population report volunteer

Youth help to build west China

The government started the "Go West" programme to help develop the (71)_____western regions of China. According to an official (72)_____,although the (73)_____of these western provinces is nearly 30 percent of that of the whole country, (74)_____people get a good (75)_____or have work skills. Last year, 6000 (76)_____college graduates went to work in the western regions. Many of these volunteers work in the (77)_____countries and towns for one or two years in the areas of education, (78)_____and (79) care.

The Ministry of Education and the Communist Youth League of China are starting a new campaign in schools and colleges to (80) _____more students to go west and improve people's lives.

II

Carbon dioxide citizens emissions energy global warming

increased major pollution producer reduce

Turning the heat down

The future of climate change is largely in the hands of the world's

(81)_____industrialized nations. Some countries like China, Japan and the European Union countries are working hard to cut their (82)_____emissions and they have already got results. The UK plans to (83)_____CO2 emissions by 20% before 2010. China has already cut its carbon dioxide (84)_____by 17%. Its leaders see (85)_____as a serious threat to society and they are making huge efforts. Some (86)_____power stations have been shut down to reduce (87)_____. Unfortunately, we cannot help but regret the attitude of the United States, the biggest greenhouse gas (88)_____of all. Its carbon dioxide emissions have (89)_____by 16%. Although governments need to develop clean (90)_____sources, ordinary citizens must also change their habits. 25% of CO2 emissions are produced by households.

III

Affected citizens cycle desertification sandstorms

Desert environment masks process thick

I can't help but feel worried about the increase in the number of (91)_____. I believe it is the most serious (92)_____problem. Every winter, the eastern regions are seriously (93)_____by sandstorms. Huge clouds travel across our country picking up (94)_____from industrial pollution on the way. The resulting dust clouds are often so (95)_____that it's impossible to see the sun and (96) have to wear (97)_____because they can't breathe properly.

We know that these storms are caused by (98)_____. And we know what the causes of this (99)_____are. Therefore, I can't believe that there is nothing to be done to stop it. We can't go on breathing dust every winter when we (100)_____to college!

Appendix IV

高一英语词汇元认知策略培训前后成绩比较表

ECFVT	ECSVT	CCFVT	CCSVT
48	75	61	65
58	78	68	64
58	69	61	67
51	69	55	67
53	68	58	61
37	69	60	69
35	62	53	60
21	54	57	56
50	73	52	55
69	79	62	69
32	72	48	46
51	87	55	64
33	58	45	57
78	85	44	50
25	60	39	43
38	70	51	48
43	74	38	54
32	43	38	45
38	66	35	38
52	73	57	59
36	62	47	43
38	67	32	40
29	41	34	36
14	39	41	53
38	66	46	41
60	67	58	53
30	65	50	39
16	50	42	46
36	53	40	54
44	65	42	44
52	62	54	57
62	73	53	53
47	77	34	43
36	58	35	34
31	64	28	34
33	53	27	30
8	37	35	39
28	37	19	27

45	72	41	38
19	48	35	40
50	65	26	32
51	80	30	34
58	80	33	33
36	57	18	24
54	77	33	32
63	75	39	34
42	76	27	27
62	71	38	41
24	51	24	32
52	76	5	13

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附：攻读硕士学位期间所发表的学术论文

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