# DEVELOPMENT OF AN E-DICTIONARY-BASED ENHANCERS FOR VOCABULARY LEARNING MODEL FOR ENGLISH AS A FOREIGN LANGUAGE STUDENTS

**Cai Hui**

**A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy in English Language Studies**

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# การพัฒนาแบบจำลองเพื่อเรียนคำศัพท์โดยใช้แบบฝึกหัดที่ใช้พจนานุกรมอิเล็กทรอนิกส์สำหรับนักเรียนที่เรียนภาษาอังกฤษเป็นภาษาต่างประเทศ

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**วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาศิลปศาสตรดุษฎีบัณฑิต**
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Suranaree University of Technology has approved this thesis submitted in partial fulfillment of the requirements for the Degree of Doctor of Philosophy.

Thesis Examining Committee

_____

(Dr. Dhirawit Pinyonatthagarn)

Chairperson

_____

(Dr. Sarit Srikhao)

Member (Thesis Advisor)

_____

(Prof. Dr. Chaiyong Brahmawong)

Member

_____

(Assoc. Prof. Dr. Kanit Khaimook)

Member

_____

(Dr. Sirinthorn Seepho)

Member

_____ _____

(Prof. Dr. Sukit Limpijumnong) (Dr. Peerasak Siriyothin)

Vice Rector for Academic Affairs Dean of Institute of Social Technology

ช่าย ฮุย : การพัฒนาแบบจำลองเพื่อเรียนคำศัพท์โดยใช้แบบฝึกหัดที่ใช้พจนานุกรมอิเล็กทรอนิกส์สำหรับนักเรียนที่เรียนภาษาอังกฤษเป็นภาษาต่างประเทศ (DEVELOPMENT OF AN E-DICTIONARY-BASED ENHANCERS FOR VOCABULARY LEARNING MODEL FOR ENGLISH AS A FOREIGN LANGUAGE STUDENTS) อาจารย์ที่ปรึกษา : อาจารย์ ดร.สฤษดิ์ ศรีขาว, 208 หน้า

งานวิจัยนี้มีวัตถุประสงค์เพื่อศึกษา 1) ผลของรูปแบบการเรียนรู้คำศัพท์โดยใช้พจนานุกรมอิเล็กทรอนิกส์เป็นฐานเป็นตัวช่วยในการช่วยให้นักศึกษาเรียนรู้ความหมายของคำศัพท์เป้าหมาย 2) ผลของรูปแบบการสอนในการช่วยนักศึกษาเรียนรู้คำศัพท์เป้าหมายในรูปแบบการเขียน 3) ผลของแบบทดสอบวัดความเข้าใจแบบถูกผิดที่แจ้งไว้ล่วงหน้า ซึ่งเป็นหนึ่งในตัวช่วยในการช่วยนักศึกษาเรียนรู้คำศัพท์ที่ไม่รู้นอกจากคำศัพท์เป้าหมาย 4) ความสัมพันธ์ระหว่างความถี่ในการเปิดพจนานุกรมและความสำเร็จในการเรียนรู้คำศัพท์ของผู้เรียน และ 5) ความพึงพอใจของนักศึกษาต่อ EBEVOL Model (จัดเตรียมโดยโปรแกรมการเรียนการสอนคำศัพท์)

กลุ่มตัวอย่างคือนักศึกษาระดับบัณฑิตศึกษาชั้นปีที่ 1 จำนวน 100 คนซึ่งได้รับการทดสอบในห้องปฏิบัติการสองภาษาที่มหาวิทยาลัยประจำมณฑล ในมณฑลกุ้ยโจว ประเทศสาธารณรัฐประชาชนจีน ซึ่งแบ่งเป็นกลุ่มทดลองและกลุ่มควบคุมตามคะแนนการสอบภาษาอังกฤษมาตรฐานแห่งชาติในการสมัครเข้าเรียนสำหรับนักศึกษาระดับบัณฑิตศึกษา กลุ่มทดลองใช้พจนานุกรมสองภาษาในขณะที่กลุ่มควบคุมไม่ได้ใช้พจนานุกรม การวิจัยแบ่งเป็นสองช่วงเพื่อให้ได้ภาพรวมทั้งหมดของ EBEVOL Model ต่อการเรียนรู้คำศัพท์กลุ่มตัวอย่างได้ทำแบบทดสอบคำศัพท์และแบบสอบถาม แบบมาตรวัด 5 ระดับทันทีหลังจากการทดลองช่วงที่ 1 และในช่วงทดลองที่ 2 ซึ่งใช้เวลาหนึ่งเดือนหลังจากนั้น นักศึกษาได้ทำแบบแบบทดสอบคำศัพท์แบบช้าและแบบสอบถามปลายเปิด ในการวิเคราะห์ข้อมูลเชิงปริมาณมีการใช้การแจกแจงความถี่แบบบรรยาย สถิติกลุ่มตัวอย่างแบบกลุ่มอิสระและการวิเคราะห์ความสัมพันธ์ระหว่างตัวแปรสองตัว ข้อมูลเชิงปริมาณใช้การวิเคราะห์เนื้อหา

ผลการศึกษาพบว่า ในการเรียนรู้คำศัพท์ใหม่ระหว่างกลุ่มทดลองและกลุ่มควบคุมมีความแตกต่างอย่างมีนัยสำคัญที่ระดับ 0.05 จากผลการทดลองแสดงให้เห็นว่ารูปแบบการสอนนี้ช่วยกลุ่มตัวอย่างในกลุ่มทดลองเรียนรู้คำศัพท์ 38.15%ในรูปแบบการเขียน และ 57.59% ในเรื่องความหมายของคำศัพท์เป้าหมาย 12 คำจากการทดสอบทันทีหลังจากการทดลอง และสามารถจำได้ 26.67% ในรูปแบบการเขียน และ43.24% ในเรื่องความหมายหลังจากการทดลองหนึ่งเดือน จากการทดลองพิสูจน์ให้เห็นว่า EBEVOL Model มีประสิทธิผลในการเรียนรู้คำศัพท์ จากการสังเกต

พฤติกรรมการเปิดพจนานุกรมของผู้เข้าร่วมการวิจัยแสดงให้เห็นว่าไม่มีความสัมพันธ์กันระหว่างความถี่ของการเปิดพจนานุกรมกับการเรียนรู้คำศัพท์ 82.2% ของผู้เข้าร่วมการวิจัยในกลุ่มทดลองมีความพึงพอใจกับโปรแกรมการทดลอง การศึกษานี้ชี้ให้เห็นว่า EBEVOL Model อาจจะสามารถนำไปประยุกต์ใช้ในการฝึกในการสอนภาษาอังกฤษเป็นภาษาต่างประเทศ โดยใช้เป็นเครื่องมือการเรียนรู้คำศัพท์เพื่อช่วยให้ผู้เรียนเรียนรู้คำศัพท์ได้

สาขาวิชาภาษาอังกฤษ ลายมือชื่อนักศึกษา_____

ปีการศึกษา 2553 ลายมือชื่ออาจารย์ที่ปรึกษา_____

CAI HUI : DEVELOPMENT OF AN E-DICTIONARY-BASED ENHANCERS FOR VOCABULARY LEARNING MODEL FOR ENGLISH AS A FOREIGN LANGUAGE STUDENTS. THESIS ADVISOR : SARIT SRIKHAO, Ph.D., 208 PP.

E-DICTIONARY/ENHANCEMENT TECHNIQUE/VOCABULARY LEARNING

This study aims to examine 1) the effect of an E-dictionary-Based Enhancers for Vocabulary Learning Model on helping students learn the meaning of target words, 2) the effect of the model on helping them learn the written forms of these words, 3) the effects of the forewarned T/F comprehension test, one of the enhancers, on helping them learn the unknown words besides target words, 4) the relationship between learners' lookup frequency and learners' vocabulary learning achievement, and 5) students' satisfaction to the EBEVOL Model (implemented by a vocabulary instruction program).

One hundred graduate first-year students participated in the experiment which was in a form of a test in two-language labs at a provincial university in Guizhou Province of China. They were assigned to an experimental group and a control group according to their scores on the nationwide standardized matriculation English test for graduate students. The experimental group was enhanced by a bilingual dictionary while the control group was provided with no dictionary. The study was carried out in two phases in order to give a holistic picture to the effects of the EBEVOL Model on vocabulary learning. Two vocabulary tests and a five-scaled Likert questionnaire were given to the participants immediately after instruction in Phase One. In Phase Two, a month later, two delayed vocabulary tests and an open-ended questionnaire were administered. Descriptive frequency, independent samples t-test, and bivariate

correlation were applied to analyze quantitative data and content analysis was applied to qualitative data.

The results revealed that significant differences of 0.05 were found between the experimental group and the control group in learning both the meaning of new words. The results also demonstrated that the model helped the subjects in the experimental group learned 38.15% of the written form and 57.59% of the meaning of the twelve target words immediately after the treatment and remembered 26.67% of the written form and 43.24% of the meaning of them after one month. The EBEVOL Model was proved effective for vocabulary learning. In the observation of the participants' lookup behavior, however, no significant correlation was found between their lookup frequency and learning of the target words. Eighty two point two percent of the participants in the experimental group showed their preference towards the experiment program. This study suggests that the EBEVOL Model may be applied in the TEFL practice as a vocabulary-learning tool to help learners learn vocabulary.

School of English Student's Signature_____

Academic Year 2010 Advisor's Signature_____

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# LIST OF ABBREVIATIONS

| | |
|---|---|
| CALL | Computer Assisted Language Learning |
| EBEVOL Model | E-dictionary-based Enhancers for Vocabulary Learning Model |
| EFL | English as a Foreign Language |
| FL | Foreign language |
| L1 | The first language |
| L2 | The second language |
| LUB | Lookup behavior |
| RC | Reading comprehension |
| TW | Target word |
| VGPT | Vocabulary Gain Productive Test |
| VGRT | Vocabulary Gain Receptive Test |
| VRPT | Vocabulary Retention Productive Test |
| VRRT | Vocabulary Retention Receptive Test |

# CHAPTER 1

# INTRODUCTION

This chapter introduces the statement of the problem, the rationale, the research hypothesis, the purposes, the research questions, and the significance of this study. Definitions of main terms are given, too.

## 1.1 Statement of the problem

Vocabulary is regarded as an essential element in language learning by both teachers and learners. Learners' lack of sufficient vocabulary is always an important problem calling for solutions in EFL (English as a foreign language) teaching and learning. As Nation (1990, p. 2) says, "Learners feel that many of their difficulties in both receptive and productive language use result from an inadequate vocabulary". If learners are short of words, they cannot communicate properly with others, nor can they express ideas clearly when speaking or writing. With many unknown words, it is also difficult for learners to make out what they are told or what they are reading. How to help students learn vocabulary is a question language teachers have to consider. Vocabulary enlargement is the key for solving this problem.

## 1.2 Rationale of the study

With the advent of computers and the Internet, a new possibility to enhance vocabulary learning is brought into the filed of EFL language learning. Because acquiring or learning new

words while reading a text is an important practical method of vocabulary enlargement, the availability of authentic materials on the Internet and the access of electronic dictionaries provide two helpful conditions for learners to learn vocabulary. First, the World Wide Web is not only one of the most efficient channels for global communication but also a huge and abundant language-learning source for EFL learners. Second, electronic dictionaries appear with computer technology combined with dictionary information. Integrated with computer technology, dictionaries assume more importance for text comprehension and vocabulary learning with its technical benefits.

For learners, electronic dictionaries are no longer as troublesome as paper dictionaries are with the characteristics of being able to show the explanations of a new word promptly. They overcome the disadvantages of a paper dictionary in the sense of saving the time used for searching for the word in a thick dictionary, which has several hundred pages or more. In the past, many educators and researchers discouraged the practice of paper dictionary use. They worried that looking up words frequently in a printed dictionary interfered with learners' memory and thus disrupted the comprehension of text (Knight, 1994). Now, in its new form, an electronic dictionary became an important instrument for learning a language, especially for learning vocabulary. The searching process for a word in an electronic dictionary is greatly shortened by the computer advantage of speed. Except for time consuming, looking up a word in a paper dictionary is a process of switches, first switching from a reading material to dictionary and then from the dictionary to the reading material. It is a disruptive process. Now with the help of e-dictionaries, learners' thought flow is no longer disrupted as much as before, especially with the function of instantly obtaining the explanation when putting the cursor on a word. With the merits of saving time and not disrupting the thought flow as much as paper dictionaries do, the e-dictionaries makes it possible for learners to read more fluently; therefore,

they increase the learners' chance of acquiring the looked up words while reading. Leffa (1992) compared the efficiency of an e-dictionary and a conventional dictionary in a translation task and found that the computer dictionary enabled the students to "understand 38% more of the passage, using 50% less time" (p. 63). Many studies (Hulstijn, 1993; Knight, 1994; Chun & Plass, 1996, Chun & Plass, 1997; Hulstijn, Hollander & Greidanus, 1996; Hulstijn & Trompetter, 1998; Laufer & Hadar, 1997; Laufer & Hill, 2000; Chun and Payne, 2004, Peter, 2007; Peters,Hulsijn, Seru & Lurjeharms, 2009, etc) show that looking up an e-dictionary (containing computerized glosses) has a positive effect on word learning. This provides evidence to the value of e-dictionary use for vocabulary learning while reading a text, especially an authentic one on the Internet or on a computer.

However, using an e-dictionary alone may accompany shallow processing of word information since the flow of reading is not disrupted much (Laufer & Hill, 2000). When the e-dictionary was used alone to help learners read a text, it was found that the retention of new words was not as high as when the e-dictionary was combined with one enhancement technique or two or three enhancement techniques (Hulstijn, 1993; Laufer and Hill, 2000; Peters, 2007; Peters et al., 2009) (for more details see Section 2.2.2 in Chapter 2). The three enhancement techniques investigated in the previous studies are word relevance, vocabulary task and vocabulary test announcement. Among them, the two enhancement techniques/tasks, i.e., word relevance (Hulstijn, 1993) and a vocabulary task (Peters, et al, 2009), play an important role in boosting vocabulary gain by directing learners' attention to target words from reading and making learners elaborately process the form and meaning connection of the words.

Word relevance is the most frequent task researchers used to make learners focus on new words to be learned. In Hulstijn's (1993) study, "relevance of words to reading comprehension questions is found to increase the chance of dictionary consultation". Laufer

and Hill (2000) point out the indispensability of a word relevance task for studies on e-dictionary, i.e., “the task which cannot be carried out without the knowledge of the words targeted for investigation”. The RC task with the factor of word relevance (called task-induced word relevance by Laufer and Hill) makes learners pay attention to the relevant new words and look them up. Learners have to look up relevant words in order to answer the questions. In fact, the effects of word relevance task are more than making learner consult a dictionary, what is more significant is “retention was very high on the immediate vocabulary tests” (Peters, 2007). Peters (2007) found when a plus-relevant word was looked up its retention was twice as high as retention of a minus-relevant target word. High retention of the plus-relevant target words should be attributed to the fact that these words were processed very elaborately (Peters, 2007). In a word, the comprehension task can make the relevant target words salient for learning by directing learner’ attention to them and then elaborately process them (Peters, 2007; Peters et al., 2009).

However, word relevance alone may not be strong enough for stable word retention, a selection of vocabulary exercises (Laufer and Hill, 2000) or word-focused activities (Peters et al., 2009) can be used for further consolidation of word knowledge. According to Laufer and Hill (2000), the vocabulary exercises may involve associative learning such as semantic or imagery technique and rehearsal of the word in isolation, in an L2-L1 pair, in phrase or sentence context. The term “word-focused activity” is from “Reading Plus” condition. Word-focused activity is used to consolidate the knowledge of the form-meaning connection after the initial presentation in the Reading Plus condition. As a consolidation task, it is called a repetition task, too. The necessity of a consolidation task/repetition task can be seen from the findings from memory studies and vocabulary studies. “Immediate repetition of a word after its initial encounter is especially beneficial for word learning” (Hulstijn; Nation, 2001, cited in Peters et al., 2009, p. 115 ) and “learners should be exposed to the new words again as soon as

possible after the first encounter in order to reinforce the form-meaning connections of these words" (Baddeley, 1997, cited in Peters et al., 2009, p. 115). The function of the vocabulary task is similar to that of word relevance. Both of them can make learners look up more and process the target words in an elaborate way. Therefore, the merits of word relevance and the vocabulary task lie in creating chances to make learners "do with words". The vocabulary task is more word-directed than word relevance.

Besides these two techniques, the third technique studied by other researchers is vocabulary test announcement (shorted as test announcement in previous studies), which is not going to be dealt in this study. Test announcement was used to forewarn students of a coming vocabulary test in order to make them pay attention to vocabulary while reading. However, it did not affect word retention although it made learners look up more words (Peters, 2007; Sercu, De Wachter, Peters, Kuiken, and Vedder, 2006; cited in Peters, 2007; Peters, et al., 2009). Test announcement may not trigger an elaborate processing of target words. Therefore, it is what students actually do with words and not the absence or presence of a test which determines the success of word retention (Hulstijn, 2001, p. 275). The importance of elaborate processing of words (what students do with words) is shown when contrasting against the inability of vocabulary test announcement.

### 1.2.1 Need for an E-dictionary-Based Enhancers for Vocabulary Learning Model

In order to optimize the effectiveness of e-dictionary use for vocabulary learning, a good way to help learners learn vocabulary is to be explored in this study based on the findings from previous studies in this field. As Al-Seghayer (2003, p. 2) points out, "the question is no longer whether an electronic glossary is effective; rather, it is how to optimize its effectiveness". Therefore, the focus of the present study is to explore a way to amplify the potential effectiveness of the e-dictionary (including electronic glossary) on vocabulary learning. This is

the legitimate reason to carry out this study, i.e., to investigate the effects of e-dictionary use enhanced by techniques on vocabulary learning in order to design a vocabulary learning model for learners to learn the meaning of target words (shortened as TW). This vocabulary-learning model is composed of three enhancement techniques (also called e-dictionary-based enhancer in this study) which make learners elaborate the TWs by noticing them first (see Section 2.1.1 in Chapter 2) and then retrieving (see Section 2.1.1 in Chapter 2) them bidirectionally in terms of their form and meaning. The model is named the E-dictionary-based Enhancers for Learning Model (shortened as EBEVOL Model) for convenience (See Figure 1.1)

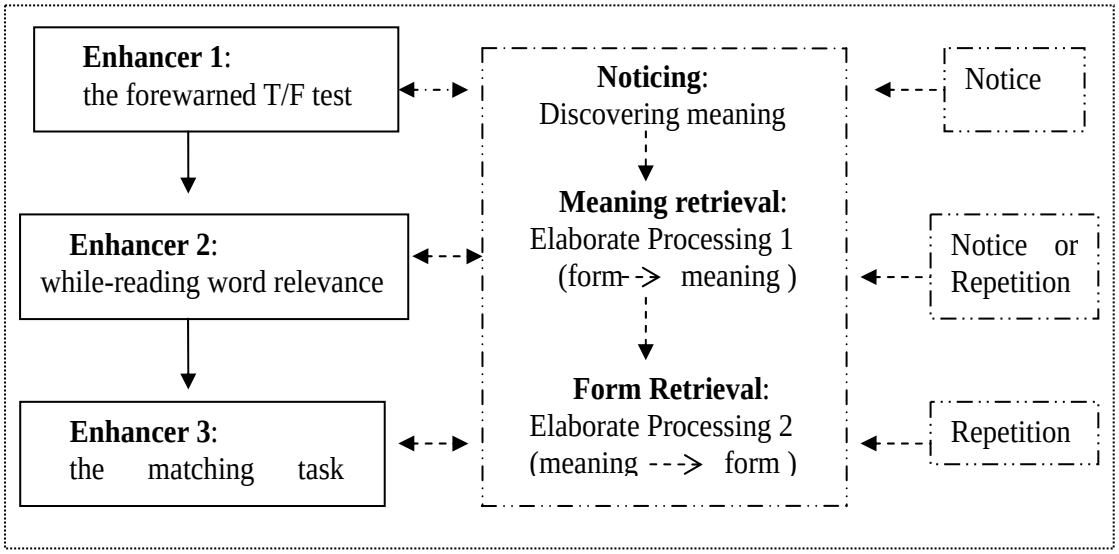



**Figure 1.1 Conceptual framework of the EBEVOL Model**

The three enhancers of the EBEVOL model are a forewarned comprehension test, while-reading word relevance and a matching task. In this study, a comprehension test in the form of a True or False comprehension test is forewarned instead of a vocabulary test. The forewarned comprehension test, Enhancer One, is to make learners pay attention to new words for the purpose of understanding the text thoroughly. Two while-reading tasks, while-reading word relevance (Enhancer Two) and a matching task (Enhancer Three) are applied to make learners elaborate the TWs bidirectionally. While-reading tasks refer to the tasks which can be

answered with text open and an e-dictionary available. While-reading word relevance is to make learners retrieve their Chinese meaning which are the right answers to the questions. Elaboration is involved in this task as the learners' attention is lead to the target words first and then to the Chinese meaning of the target words. The matching task is to make the learners go the opposite direction and retrieve the written form of the TWs according to their Chinese meaning in the questions of the task. It focuses on their written form instead of their meaning. Elaboration on target words is involved again in this task concerning the form and the meaning connection of these words. All in all, the three enhancers are for the learning of target words with the first enhancer making learners "notice" the target words, Enhancer Two and Enhancer Three making them elaborate on these words and functioning at the same time as repetition tasks. If a learner fails to notice any of the target words during the first reading of the text for a thorough comprehension of the text, while-reading word relevance will lead their attention to the target words and induce them to elaborate on them. Next, Enhancer Three will function as a repetition task and make them go the opposite direction and elaborate on these words simultaneously.

Target words are to be designed to be unknown to all of the participants. However, there may be other unknown words besides TWs in an authentic text for them. Enhancer One, the forewarned comprehension test may make the learners learn other unknown words while reading for a thorough comprehension of the text at the same time. The learning of the other unknown words besides target words is another focus of this study. Therefore, there are two reasons to carry out this study from the perspectives of target words and other known words.

### 1.2.2 Development of the EBEVOL Model

The EBEVOL Model is to be developed as an effective method to help learners learn target words with the above-mentioned three enhancement techniques/e-dictionary-based enhancers in this study.

Firstly, the forewarned T/F comprehension test is to make learners focus on the information the text conveyed therefore to create the need to know the meaning of relevant words including target words (for more details see Section 2.1.1 in Chapter 2). Secondly, the word relevance questions will make learners retrieve the meaning of the TWs or notice and elaborate the TWs if they did not pay attention to them in the first reading (for more details see Section 2.1.1, 2.2.2, in Chapter 2). Lastly, the matching task will make learners retrieve the written form of the TWs. The matching task is a vocabulary task benefitting to the gaining of words' spelling form. It is a vocabulary consolidation task. Vocabulary consolidation tasks have been studied a lot in a Reading Plus condition. Productive vocabulary tasks as vocabulary consolidation tasks yield good vocabulary learning gains, such as a sentence-writing task (Laufer, 2001). The matching task used in this study requires the learners to match the meaning of the target words with its spelling form in the text, i.e., find the target words from the text at the sight of their meaning and write them down. In nature, it is a translation task which makes use of the English-Chinese bilingual dictionary they can access.

Besides helping learners learn the meaning (referred to as receptive knowledge in this study) of the TWs, the vocabulary-learning modal may also help learners acquire their spelling form (referred to as productive knowledge in this study, see Section 2.1.2 in Chapter 2). The gaining of the spelling knowledge of the target words calls for study since few studies have focused on this perspective. It is a tentative study on the effects of e-dictionary use on the gaining of productive knowledge of the target words.

### 1.2.3 Observation on the effects of an e-dictionary on learning non-target unknown words for each participant

To investigate the effects of an e-dictionary on vocabulary learning, a few target words, which were unknown to all of the participants, were usually selected in previous studies.

It was difficult for learners to make their meaning out from the context in most of the studies. However, there may be some unknown words besides the target words in the same text for different learners, whose existence is unavoidable especially when the text is authentic. It may be possible for the participants to acquire some of these words. The target words and other unknown words together impose the learning load for each participant. Different participants have different learning load from all the unknown words. Few studies have paid attention to the unknown words besides the target words for each participant. However, focusing solely on learning of target words cannot reflect the effects of an e-dictionary on vocabulary learning while reading. Without exploring the effects of e-dictionaries on other unknown words besides the TWs, a holistical picture cannot be given to the effects of the e-dictionary. To fill in this research gap, this study is to depict how an e-dictionary helped learners learn or acquire non-TWs, i.e., the learning of other unknown words besides the target words for each learner will be examined, too. The T/F comprehension test is to be forewarned to make learners focus on all of the unknown words as well as the TWs in the text.

To conclude, the present study aims to examine the effects of e-dictionary use on vocabulary learning while reading an authentic text under enhancement techniques/ enhancers. For different learners, it is highly possible that they have a different unknown word list from each other. Among all of the unknown words for each learner, there are words unknown to all of the participants. Target words can be picked out from the words unknown to all of the participants if they satisfy certain controlled condition for this study (see Section 3.4.4 in Chapter 3). The main purpose of this study is to explore the effects of three e-dictionary-based enhancers on target-word learning from which a vocabulary-learning model is to be developed. A vocabulary instruction program is to be designed in order to carry out this study. The model is composed of three e-dictionary-based enhancers, i.e., the forewarned comprehension test,

while-reading RC word relevance and a matching task. The effect on learning the spelling form of TWs is to be tentatively explored as well as the effect on learning the meaning of target words. At the same time, this study will also investigate the effect of e-dictionary use on the learning of other unknown words for each learner under one technique alone, the forewarned true or false reading comprehension test.

## 1.3 Research hypothesis

The research hypothesis is the E-dictionary-Based Enhancers for Vocabulary Learning Model can help learners learn the meaning of the target words.

## 1.4 Purposes of the study

The purposes of this study are listed as follows:

1. To develop the EBEVOL Model using three e-dictionary-based enhancement techniques/enhancers for vocabulary learning;

2. To examine how well the EBEVOL Model helps the students learn two types of vocabulary knowledge of the target words immediately and one month later;

3. To examine the effects of a forewarned T/F comprehension test on the learning of unknown words besides target words;

4. To explore the relationship between learners' lookup behavior and learners' vocabulary learning achievement;

5. To explore students' satisfaction towards the vocabulary instruction program.

## 1.5 Research questions

To fulfil the purposes of this study, the following questions are addressed.

1. Is there a significant difference in the learning of the target words ’meaning between the control group and the experimental group?

2. To what extent does the EBEVOL Model help learners learn target words receptively and productively?

3. Do learners in the experimental group learn more unknown words besides the target words than those in the control group do? If so, to what extent?

4. Is there a correlation between learners’ lookup frequency and their vocabulary scores?

5. What are the reasons for the preferences of this vocabulary instruction program?

## 1.6 Significance of the study

E-dictionaries provide a new possibility of helping learners to learn vocabulary from reading, especially from reading authentic texts on computer. However, previous related studies show that the e-dictionary alone is not enough. Enhancement techniques, especially word relevance and a vocabulary task, are necessary to boost vocabulary gain by creating chances for learners to notice and elaborate new words. More studies are needed for examining the effects of such enhancement techniques that are beneficial to vocabulary learning, especially from the following aspects, which embody the significance of this study:

1. This study is to design a vocabulary-learning model for learning vocabulary by consulting the e-dictionary under a combination of enhancement techniques. A bilingual e-dictionary is to be used in this study. As it is found that the bilingual e-dictionary may help these learners greatly with the shortest word definition in mother tongue (see section 2.2.1 in Chapter 2), an effective way of learning vocabulary by enhanced e-dictionary use may be found

for learners, especially for the intermediate learners who occupy the largest proportion of EFL population. The model may be useful for CALL (Computer Assisted Language Learning) courses, especially for integrative reading, and extensive reading as well. It is of practical significance for the design of the self-study disc for these courses, too.

2. This study attempts to explore if learners could learn words' spelling form from e-dictionary use under the combination of enhancement techniques. Few studies in which target words appeared once have measured enhanced vocabulary learning from the perspective of productive knowledge of the words. In this study, the gaining of productive knowledge of the target words is to be examined and measured. An effective way may be found for helping learners learn words' spelling form from reading.

3. This study will present the effects of the e-dictionary on vocabulary learning by focusing on all of the unknown words for each participant. This is a new trial due to the fact that most of the related studies in this field only center on certain target words, which are usually difficult words or pseudo-words. The effects of the dictionary on other unknown words are not investigated sufficiently. To cover this gap, this study is to focus on other unknown words besides TWs by each participant as well as the chosen target words for all of them. Therefore, a holistic picture is to be provided to the effects of enhanced e-dictionary use on vocabulary learning.

In a word, this study will shed some light on how to make use of an e-dictionary to help learners to learn vocabulary and to make a better use of computer technology for language teaching and learning.

## 1.7 Definitions of terms

Some key terms that need clarifications were defined below.

1. **English as a Foreign Language (EFL):** English studied by non-native speakers as a foreign language in an environment where English is not spoken as the first language.

2. **An electronic dictionary:** A software installed in the computer which can show the dictionary information for words.

3. **A bilingual dictionary:** A dictionary in which the target words are explained in learners' mother tongue.

4. **Target words**：The words for learners to learn in this study.

5. **Unknown words**：Any word a learner does not know in the text to be read in this study.

6. **Lookup frequency**：The number of times a word being looked up in a dictionary by learners.

7. **Word relevance**：The fact that the exercises, e.g., reading comprehension questions, are relevant to the target words. Without the knowledge of target words, learners cannot answer these questions correctly.

8. **Receptive knowledge of a word**：A specific L1 definition of the target word.

9. **Productive knowledge of a word:** A specific L2 equivalent for the L1 word.

10. **An enhancement technique from using an e-dictionary/ an e-dictionary-based enhancer**：The technique helping learners learn words by looking up in an e-dictionary. There are two necessary factors for an enhancement technique/enhancer: dictionary access and the questions for the task/test whose function is to induce students to look up the relevant words in the dictionary if they do not know the form-meaning connection of the unknown words. When the dictionary is not available, questions alone do not compose an enhancement technique.

11. **EBEVOL Model**: The E-dictionary-Based Enhancers for Vocabulary Learning Model in which three enhancement techniques, i.e., a forewarned T/F comprehension test, while-reading word relevance, and a matching task help learners learn vocabulary by using an e-dictionary while reading a text.

# CHAPTER 2

# LITERATURE REVIEW

This chapter is the review of the related literature that is of importance to this study. It is composed of two parts: two basic constructs of vocabulary learning for this study and the variables related to learners' lookup behavior (shortened as LUB).

## 2.1 Two basic constructs of vocabulary learning

The present study focuses on the effect of EFL learners' e-dictionary use on vocabulary learning. There are two basic constructs of vocabulary learning for this study: 1) learning words from using the e-dictionary while reading a text and 2) vocabulary knowledge. The first construct is about learning words from using e-dictionaries. The second construct discusses vocabulary knowledge and the way to assess vocabulary gain.

### 2.1.1 Learning words from using e-dictionaries

This construct is composed of related theories and research findings in the filed of using e-dictionaries to learn vocabulary through reading. It is dealt with the following three aspects: vocabulary-learning factors related to this study, fairly beneficial conditions provided by using an e-dictionary to facilitate vocabulary gain while reading, and how e-dictionary use is interwoven with vocabulary learning strategies.

**1) Vocabulary learning factors related to lookup behavior**

Vocabulary learning is a process concerning memory. Besides memory, there are other important factors leading to better vocabulary retention when the target words are in a text,

which usually involves elaboration strategies. Elaboration strategies are necessary on the part of learners as readers before a memory trace for a noticed word is created. These strategies can help them learn words better. There are three important factors related closely with e-dictionary consultation. They are noticing, retrieval (Nation, 2001), and task-induced involvement load (Laufer and Hulstijn, 2001). “Noticing” is the first step, that is, it is “primary” to draw learners’ attention to the words themselves. However, noticing itself is not enough for the occurrence of word being learned. More ways to elaborate the words are called for, such as, a task involving the target words to make students focus on these words by searching or retrieving their meaning.

“Noticing” and “retrieval”, the first two factors come from Nation’s (2001, p. 63) “three important processes that may lead to a word being remembered”. According to Nation, the three processes, noticing (through formal instruction, negotiation, the need to comprehend or produce, and awareness of inefficiencies etc), retrieval, and creative (generative) use, are the three psychological conditions for vocabulary learning. Noticing and retrieval are closely related with vocabulary learning with dictionary lookup while reading.

**(1) Noticing**

Noticing is an important factor encouraging language learning. Schmidt (2000) defines “noticing” as what psychologists call *attention*, which is roughly equivalent to “clear perception” and “detection within selective attention” (Tomlin and Villa, 1994; Carr and Curran, 1994). Ellis (1991), McLaughlin (1990) and Schmidt (1990) all pointed out that learners need to notice the word, and be aware of it as a useful language item. Schmidt (1990, 1993, 1995) identified three aspects of consciousness involved in language learning: awareness, intention and knowledge in the Noticing Hypothesis. The first sense, consciousness as awareness, embraces noticing. The noticing hypothesis points out the importance of “noticing” that what learners notice in input is what becomes intake for learning.

In much of SLA research, Fotos (1993), Robinson (1995), Schmidt (1990, 1993) focused on attention to the form. Attended learning is usually focusing on grammar (or syntax), but lexical researchers began to apply this term to vocabulary learning as well. L2 learning, especially adult L2 learning, is impossible without attention to vocabulary input in the sense of "noticing" it. Schmidt and Frota (1986), and Ellis (1990) also point out that several factors may affect this noticing. They are the noticeability of the word in the textual input, learners' previous contact with the word, and learners' awareness that the word fills a gap in their knowledge of the language (cited in Schmidt,1995, p.20). Schmidt (1994b) indicates that attention to input is necessary for explicit learning and it may be both necessary and sufficient for implicit learning. With regard to vocabulary learning, Ellis (1994) claims that the perceptual aspects of new words, i. e. acquiring their phonetic and phonological features, are concerning implicit learning as a result of frequent exposure. Similarly, the motor aspects of the articulation of words is from explicit learning, requiring the conscious processing at the semantic and conceptual levels and paying attention to the form-meaning connections.

Noticing takes place when learners consult a word in a dictionary, study a word on purpose, guess from context, or have a word explained to them, etc. A learner may resort to the use of a dictionary in two circumstances. The first one is when he notices an unknown word while reading and wants to know the meaning of this word if he fails to make out /guess its meaning from context. The second one is when he wants to confirm its meaning of which he is not sure. The factor "noticing" will determine whether a learner lookup a word in a dictionary or not and how many times he will consult a dictionary. The process of separating the word from context in order to look it up in a dictionary is a form of decontextualisation. As a form of noticing, this practice of decontextulisation benefits vocabulary learning greatly. Decontextualisation takes place when learners pay attention to a language item as a part of the

language rather than as a part of a message. Defining is a way of decontextualisation (Nation, 2001, p. 64). Brett, Rothlein and Hurley (1996) found that vocabulary learning was increased if vocabulary items were briefly explained while learners were listening to a story. Ellis (1995) indicates that simple definition is the most effective explanation. Nation (1982) has found that learning is faster if the meaning of a word is conveyed by a first language translation for many learners. This may be due to the fact that the first language translations are the simplest kind of definition. They are short and draw directly on familiar experience to learners. Anyhow, no matter in what kind of language the definition is, the function of decontexutalisation means that a learner separates a word from its context and pays special attention to it thus to learn the word effectively.

Because of the importance of this factor, “noticing” has been treated as an indispensable research condition in many studies on dictionary lookup behavior.

Researchers have tried various ways to make students “notice” the TWs, such as “highlighting”, “test announcement”, and “word relevance”, etc (see section 2.2.2 in this chapter).

**(2) Retrieval**

The second factor is retrieval. Baddeley (1990, p. 156) claims that retrieval may lead to a word being remembered. The word “retrieval" means the process of accessing information from memory or other storage devices (dictionary definition). Researchers such as Bialystok (2000) and Segalowitz (2000) elucidate the need for greater cross-disciplinary interaction between applied linguistics and psychology with respect to many issues in language acquisition and the study of “retrieval” is one. Jacoby (1978), and Slamecka & Graf (1978) all have found that an opportunity to retrieve words increases memory for known words and may affect memory for new words. As human’s memory may decrease, retrieval helps learners keep

known words in the memory. The research conducted by Slamecka & Graf (1978) suggests that memory for an item improves when the learner is allowed to retrieve the item. Nation (2001, p. 66) gives a good description of how “retrieval” works when related to word learning:

> A word may be noticed and its meaning comprehended in the textual input to the task, through teacher explanation or dictionary use. If that word is subsequently retrieved during the task then the memory of that word will be strengthened.

There are two kinds of retrieval: receptive and productive. Receptive retrieval involves perceiving the form and having to retrieve its meaning when the word is encountered in listening or reading. Productive retrieval involves wishing to communicate the meaning of the word and having to retrieve its spoken or written form as in speaking or writing. Nation (2001) claims that retrieval usually does not take place when the form and its meaning are presented simultaneously to the learner. In this study, retrieval is mainly receptive during the process of reading. It is also called word recognition. Every time when a learner notice a word met after the first encounter in the reading process, retrieval occurs when he tries to recall its meaning from memory. If he fails to recall its meaning, possibly, he will consult the word in a dictionary and the process of retrieval will benefit word learning. Segalowitz, Poulsen, and Komoda (1991) suggest that to develop reading proficiency, training in lexical lookup, associating a print/ phonological pattern with a meaning, are necessary in decreasing demands on working memory.

Retrieval is also closely related to word repetition. Whenever a learner encounters a new word while reading for the second time or more (if the time gap between the first encounter and second encounter is not too long for him to forget the word totally, otherwise it will be counted as a first time), it involves retrieval of the meaning of the word from memory. Whenever he recalls the meaning of a word repeated one more time in the text, retrieval occurs.

Every lookup behavior of a word in a dictionary a learner makes shows two things: he notices the new word or he fails to recall its meaning, therefore a new consultation is needed. The lookup frequency stands for the times a learner notices a word. The lookup frequency of a learned word embodies the necessary encounter times for the word to be learned by each of the learners. The lookup frequency minus one might also be the times a learner retrieve the meaning of the word. It is different from exposure frequency of a word.

From previous studies, two tasks can make learners search or retrieve the meanings of the target words: a reading comprehension task with the factor of word relevance (shortened as word relevance) and a post-reading vocabulary task. Peters (2007) explained the occurrences of retrieval on his "plus-relevant" target words (there are minus relevant target words, too) during the process of finding and writing answers for the RC test in his study: students read the target word in the text (first encounter), looked it up (second encounter), reread the sentence with the plus-relevant target word (third encounter) and finally wrote down the answer (fourth encounter). This kind of retrieval may not necessarily happen to all of the plus-relevance target words, since learners may choose to ignore some of them while reading before answering the relevant reading comprehension questions.

If word relevance does not trigger a "retrieval", the vocabulary task as a repetition task makes a forced retrieval of a target word's meaning. Peters et al. (2009) emphasize the importance of the three factors for successful L2 vocabulary acquisition: "finding the meaning of an unfamiliar word (which may produce only a fleeting form of processing), subsequent elaborate processing, and repetition".

> The three enhancement techniques prompted students to *look up* words. The word-directing comprehension questions (word relevance) induced *elaborate processing*. The vocabulary task enforced the *repetition* of the form-meaning connections of the (plus-relevant) target words, and this turned out to be a successful reinforcement of the previous elaborate processing (Peters et al, 2009, p.147).

Notwithstanding, it is obvious that the target words can be processed in a quite elaborate way by a word-directed comprehension task or a vocabulary task.

**(3) Task-induced involvement load**

In order to investigate learners' lookup behavior, Laufer and Hulstijn (2001) introduced a construct of involvement with motivational and cognitive dimensions: need, search, and evaluation. According to them, "The *need* component is the motivational, non-cognitive dimension of involvement." It may be the learner's own need to know the meaning of a word in order not to obstacle comprehension while reading or it can be "externally imposed" by the requirement of a task. "*Search* and *evaluation* are the two cognitive (information processing) dimensions of involvement, contingent upon noticing and deliberately allocating attention to the form-meaning relationship" (Schmidt 1994a, 2000, cited in Laufer and Hulstijn, 2001, p.14). Search is the act to find the meaning of a new word or to find the L2 word to express a concept by consulting a dictionary or other authority. Evaluation is the act to "assess whether a word (i. e. a form-meaning pair) does or does not fit its context".

The construct of task-induced involvement load claims the importance of task for inducing learners to lookup word by creating "need". Learners' retention of unfamiliar words is determined by the amount of involvement (elaborate processing) while processing these words. For the same words, tasks with higher involvement load will lead to better vocabulary gain than tasks with lower involvement load will do.

Laufer and Hulstijn's construct of involvement is operationalized by tasks designed to vary in the degree of need, search, and evaluation (see Table 2.1).

**Table 2.1 Task-induced involvement load (p. 18)**

| Task | Status of target words | Need | Search | Evaluation |
|---|---|---|---|---|
| 1. Reading and comprehension question | glossed in text but irrelevant to task | - | - | - |
| 2. Reading and comprehension questions | glossed in text and relevant to task | + | - | - |
| 3. Reading and comprehension questions | Not glossed but relevant to task | + | + | -/+(depending on word and context) |
| 4. Reading and comprehension questions and filling gaps | Relevant to reading comprehension. Listed with glosses at the end of text listed with glosses. | + | - | + |
| 5. Writing original sentences | Listed with glosses. | + | - | ++ |
| 6. Writing a composition | concepts selected by the teacher (and provided in L1) The L2 learner-Writer must look up the L2 form | + | + | ++ |
| 7. Writing a composition | Concepts selected (and looked up) by L2 learner-writer | ++ | + | ++ |

To conclude, the three vocabulary learning factors, i.e., noticing, retrieval and task-induced involvement load, benefitting for learning words involve elaboration strategies. As Anderson (1995, cited in Laufer and Hulstijn, 2001, p.1) and Baddeley (1997, cited in Laufer and Hulstijn, 2001, p.1) point out “elaboration on features of new words promotes their retention”. This proposition is based on the statement that “all improvement of the memory lies in the line of elaborating the associates”, what learning psychologists have been repeating for many decades after William James (1890, p. 662). This means that the more attention paid to the formal and semantic aspects of words and the richer the associations made with existing knowledge (e.g. in the form of establishing similarities and contrasts between old and new information), the higher are the chances that the new information will be retained (Laufer & Hustijn, 2001). One point worth our attention is that “noticing” is not sufficient for the actual acquisition of words. It is what

students actually do with words determines the success of word retention.

In this study, the comprehension questions relevant to a task meet the first component of the task-induced involvement load, i.e., “need”. The comprehension questions include the forewarned T/F questions and the while-reading comprehension questions. The T/F comprehension test is supposed to establish the factor of “need” for learner to know the meaning of unknown words, which may obstacle their understanding of the text while reading when they are forewarned of the upcoming test of many questions. Even if the forewarned the T/F comprehension test fails to do so, the while-reading RC questions will create the “need” again. When the forewarned T/F comprehension test makes learners “notice” the unknown words, including the TWs, the while-reading RC questions and the matching task will make learners “retrieve” the meaning and the spelling form of the target words separately. If the forewarned T/F comprehension test fails to make learners notice the TWs, the while-reading word relevance questions will make them “notice” the TWs and the matching task would make learners “retrieve” their spelling form.

In the actual use of e-dictionaries in daily life, learners have to “search” for the proper explanation for a polysemous word according to the context it is in. There involves a process of “evaluation”, too. However, the dictionary information for the TWs was context-bounded in this study, the components of “search” and “evaluation” were not involved for them. For the polysemous words not on the TW list, the two components of involvement load were involved.

The matching task involves another two components of the involvement load “search” and “evaluation”. The matching process is a process of searching and evaluating.

Overall, the three enhancement techniques satisfy the conditions of the vocabulary learning factors theoretically.

**2) Beneficial conditions for vocabulary gain while reading**

It looks like it is an inefficient and impractical way for EFL learners to learn new words from reading alone since they do not receive sufficient input and do not have sufficient encounters with new words as L1 learners do. Extra aids，e.g.，enhancement techniques，should be provided to benefit learners' vocabulary learning, such as glosses, dictionaries, vocabulary exercises, etc.

According to Krashen (1989), L1 learners learn a large number of words mainly through reading and vocabulary acquisition while reading occurs incidentally from learners' guesses. Learners acquire new words by guessing their meanings from contextual clues. This is called input-oriented language acquisition (Brown, 1994; Day&Bamford, 1998; Krashen, 1993; Nation, 1990). In order to comprehend the text, the processing of unfamiliar lexical items is triggered. Krashen (1989) holds that further processing and integration of new words into the mental lexicon may occur from the exposure to meaningful and contextual input.

However, researchers found very small vocabulary gains from reading books alone by EFL learners. Horst, Cobb and Meara (1998) found averagely five words were picked up from a simplified version of a novel, *The* Mayor *of Casterbridge*, which had 21,000 running words. In Lahav's (1996, cited in Laufer, 2001) study, students who read 4 simplified readers with each about 20,000 words picked up 3-4 words per book. What is more, Hulstijn, Hollander and Greidanus (1996) found foreign language students often failed to learn the meaning of unknown words from reading due to failure to infer the correct meanings of unfamiliar words, or not having sufficient contextual clues to guess the word meaning. Reading is not necessarily the main, nor the best, source of vocabulary learning in a foreign language. Knight (1994), Chun & Plass (1996), Hulstijn, Hollander, & Greidanus (1996), Laufer & Hill (2000), and Al-Seghayer (2001) explored the beneficial conditions for vocabulary gaining while reading and found both acquiring words from contextual clues and learning from glosses or (online/ electronic)

dictionaries benefited word retention. Among the three beneficial conditions for vocabulary learning while reading, i.e., contextual clues (for guessing form context and acquire new words), glossing (marginal), and the use of electronic dictionary, the use of electronic dictionary is the most potential way affecting vocabulary gain while reading.

Contextual clues are not as good as the use of electronic dictionaries. In Knight's study (1994a), contextual clues are found to benefit vocabulary learning more than a dictionary does only on the condition that the context provides definitions or examples of the new words. She compared the effect of CALL dictionary lookup with guessing words from context and found that students making use of the dictionary learned more words and got higher reading comprehension scores. The study also shows that students who used the dictionary acquired more word meanings than those who did not. It seems that the context provided with definitions or examples of the new words offer a similar learning environment for the new words as a dictionary does. Both of them facilitate vocabulary gain. However, it is not easy to compile a context with definitions or examples for a new word compared with ready-made dictionaries. The use of dictionaries is more convenient.

Luppescu and Day (1993) found that students who read a text and looked up unknown words in a dictionary remembered them better than students who read the text without the dictionary.

The use of dictionaries is better than the marginal glosses, too. Hulstijn et al. (1996) investigated the differential effects of marginal glosses and a paper dictionary on incidental vocabulary acquisition with advanced L2 learners. They found a low dictionary-consultation frequency and gloss group gained higher retention scores than the dictionary group and the control group did. However, for the few students alone in the dictionary group, who consulted the paper dictionary, their retention scores were higher than those of the marginal gloss group

are. We may take for granted that learners' vocabulary learning efficiency can be improved greatly when they are motivated to consult words in a dictionary and when the lookup behavior is as easy as consulting marginal glosses, that is, by using an e-dictionary.

While reading a text, dictionary use is a valid activity for foreign learners of English as an aid to comprehension. Summers (1988) points out that dictionary is an excellent source of the linguistic knowledge for learners to understand English accurately in addition to other learning strategies, such as guessing the meaning of new words encountered while reading, asking the teacher for explanations, or asking help from their classmates.

Dictionaries can provide further exposures for a word in other contexts, with different collocates and constructions, and making the student think about the words in relation to both the passage being read and the dictionary information. According to Summers (1988), the dictionary definitions and examples provide contexts which have been specially written to make it as easy as possible to infer the most likely meaning of the word. In fact, even only provide the dictionary definition, if on the condition that it explains the meaning of the word in the reading context, the consultation of the dictionary benefits vocabulary learning.

For native speakers, looking up meaning might be the most frequent use of a dictionary. Checking for correct spelling comes as the second. The consultation of dictionaries is generally expected and actively encouraged in most native-speaker schools and colleges in the UK and the USA. However, training in dictionary skills might be less common in ELT according to the researchers' knowledge.

Bilingual dictionaries are more generally employed in the beginning stages of learning a language. As proficiency develops, greater use is made of a monolingual dictionary. Baxter (1980) concludes that prolonged dependency on bilingual dictionaries may retard the development of second-language proficiency, even though such dictionaries are usually kept for

use when definitions given in a monolingual dictionary are insufficiently understood. The main distinctions between monolingual dictionaries for native and for non-native speakers lie in that kinds of information supplied. For the non-native user, a main aim is to supply encoding information, which will allow for productive use of the language.

Dictionaries can be used for both receptive and productive use. The bilingual dictionaries provide meanings in a very accessible way, and they can be bi-directional: English-first language and first language–English. The e-dictionaries used in this study are for receptive and productive use. The direction of the bilingual dictionary is from English to first language to help learners read.

There are two types of dictionaries these days. From the material a dictionary is made of, there are paper dictionaries and electronic dictionaries. The students usually prefer the electronic format to the printed dictionary just as most of learners prefer a bilingual dictionary to a monolingual dictionary (see section 2.2.1 in Chapter 2). In fact, these two preferences give the students the same advantage, that is, speed. The bilingual dictionary enables them to understand (or to believe they understand) the meaning of the word quickly and almost effortlessly, and the electronic format enables quick search, compared to the printed format. These findings show that the use of dictionaries leads to better word gain. By overcoming this shortcoming of consulting a paper dictionary, electronic dictionaries can play a better role of helping learners learn vocabulary while reading a text. Learners' lookup behaviors of using electronic dictionaries, which can be traced unobtrusively and avoids learners' awareness are worth further study in relation to vocabulary gain.

Finally, it is necessary to make clear the meaning of vocabulary gain while reading in this study. When talking about vocabulary learning while reading, a problem will arise about whether it is incidental or not? Is it acquisition or learning? It is necessary to distinguish the two

terms. Intentional learning refers to learning that students consciously undertake. It is designed or planned by teachers and students. Intentional learning is for learners to focus their attention directly on the information to be learned, which gives the greatest chance for its acquisition. Rote memorization of vocabulary and practice at reading graded materials with accompanying comprehension questions are some kinds of intentional learning as well as grammar drills and writing with feedback. This process of intentional learning takes long periods of hard intellectual effort. When intentional learning occurs, the learners deliberately attempt to learn. As for incidental learning, it is a by-product of exposure to the tasks such as reading or listening to broadcasting or seeing a movie. Wode (1999) points out that incidental learning is "language learning as a by-product of language use by the teacher or anybody else in the classroom, without the linguistics structure itself being the focus of attention or the target of teaching maneuvers"(P.245). However, for either learning to occur, students must have noticed and processed the new element. Both Ellis (1994) and Schmidt (1994a)l agree that attention to an unknown word seems to be a prerequisite for any learning to occur, no matter it is incidental learning or intentional learning.

There are different terms such as "learning", "acquisition", "incidental acquisition", "incidental learning", "instruction", etc to describe the process of knowing a word. After the discussion about the terms: "incidental", "acquisition", "learning", in this study, we know the process for learners to notice new words while reading is "incidental learning", but when a LUB occurs, whose purpose is to learn the word, it is an intentional learning process. To avoid confusion, we will not make distinction for these terms. We will not distinguish clearly about "being incidental", or is it "acquisition" or "learning" in this study. The process is only regarded as a vocabulary gaining process. In addition, "vocabulary gain", "vocabulary retention", "vocabulary learning", and "vocabulary acquisition" are used interchangeablely in this study

except for the variable of vocabulary gain and retention. When mentioning this variable, vocabulary gain refers to the vocabulary achievement in the immediate vocabulary tests and vocabulary retention refers to the vocabulary achievement in the delayed vocabulary tests.

**3) Dictionary use and vocabulary learning strategies**

In a sense, any method to learn vocabulary belongs to vocabulary learning strategies. The reason to mention vocabulary learning strategies in this study is because the use of a dictionary with enhancement techniques contains several vocabulary learning strategies, according to Nations' taxonomy.

Vocabulary learning strategies, like any other learning strategies, emphasize on learners' active role in the learning process. Vocabulary learning strategies are the strategies helping word mastering. There are a lot of vocabulary learning strategies, and many researchers have attempted to develop a taxonomy of vocabulary learning strategies, which is usually part of a piece of research into learners' strategy use (Nation, 2001, p. 217). Schmitt (1997) proposed an extensive taxonomy developed from Oxford's (1990) social, memory, cognitive and metacognitive categories. Gu and Johnson (1996) also developed a substantial list which includes: beliefs about vocabulary learning, metacognitive regulation, guessing strategies, dictionary strategies, note-taking strategies, memory strategies (rehearsal), memory strategies (encoding) and activation strategies. Williams (1985) described five potentially trainable strategies for working out the meaning of unfamiliar words in written text: inferring from context, identifying lexical familiarization, unchaining nominal compounds, synonym search and word analysis.

The vocabulary learning activities by using a dictionary while reading with enhancement techniques involve many vocabulary learning strategies in Nation's taxonomy (see Table 2.2).

**Table 2.2 A taxonomy of kinds of vocabulary learning strategies (Nation, 2001, p. 217)**

| General class of strategies | Types of strategies |
|---|---|
| Planning: choosing what to focus on and when to focus on it | Choosing words<br>Choosing the aspects of word knowledge |
| | Choosing strategies |
| | Planning repetition |
| Sources: finding information about words | Analyzing the word |
| | Using context |
| | Consulting a reference source in L1 or L2 |
| | Using parallels in L1 and L2 |
| Processes: establishing knowledge | Noticing |
| | Retrieving |
| | Generating |

Reading with an electronic dictionary equipped provides an optimal condition to facilitate word learning. This is the focus of this study. From Table 2.2, glossing or dictionary use is one of the vocabulary learning strategies-“consulting a reference source in L1 or L2” in the part of “sources: finding information about words”. Other two strategies, “analyzing the word” and “using context” under the same class may also help learners to “know” an unfamiliar word when some of them try to guess its meaning.

In this study, the process of learning vocabulary contains two strategies of “establishing knowledge”, i.e., noticing and retrieving. The factor of word relevance makes learners notice the target words. After learners’ attention is lead to the target words, they need to find relevant information from the context or by consulting the e-dictionary provided for their meaning or to check if the guessed meaning is correct or not. The while-reading word relevance and the matching task make them “retrieve” the meaning and the written form of the target words. By noticing and retrieving word knowledge, learners complete the processing stage of word information. “Generating” was not involved. “Noticing” and “retrieval”, as the two vocabulary learning factors in this study have been explored in former sections.

By comparing with Nation's taxonomy of vocabulary learning strategies, it looked possible that e-dictionary use with certain enhancement techniques might help learners learn vocabulary.

### 2.1.2 Vocabulary knowledge

The second construct was about vocabulary knowledge. In order to examine the effects of dictionary lookup behavior on vocabulary gain and retention, it was essential to assess vocabulary knowledge in this study. However, it is not an easy job to answer the question of how to measure vocabulary gain, or how to judge whether a word is learned. There is no standard answer to this question since different researchers use different aspects of vocabulary knowledge to answer it. Although there are variations in their answers to this question, the reception and production distinction is the accepted common base of their answers. Therefore, the reception and production distinction from the basic aspect, the form and meaning aspect, is chosen as the judging standard of word learning in this study.

The receptive/productive distinction is proposed by Nation (1990, p. 30) in answering the question "what does a learner need to know in order to 'know' a word?" by two answers describing the receptive/productive use for knowing a word:

> If the word is to be learned only for receptive use (listening or reading) then there is one set of answers. If the word is to be learned for receptive and productive use (listening, speaking, reading, and writing), there will be an additional set of answers. (p. 31)

Nation (1990) gives a whole-picture description of receptive/productive knowledge from all aspects for mastering a word:

> Knowing a word receptively involves being able to recognize it when it is heard (what does it sound like?) or when it is seen (what does it look like?)… Knowing a word includes being able to recall its meaning when we meet it. It also includes being able to see which shade of meaning is most suitable for the context that it occurs in. In addition, knowing the meaning of a word may include being able to make various associations with other related words.
> Productive knowledge includes receptive knowledge and extends it. It involves

> knowing how to pronounce the word, how to write and spell it, how to use it in correct grammatical patterns along with the words it usually collocates with. Productive knowledge also involves not using the word too often if it is typically a low-frequency word, and using it in suitable situations. It involves using the word to stand for the meaning it represents and being able to think of suitable substitutes for the word if there are any. (p.31-33)

Nation (2001, p. 27) provides the revised version of these questions (see Table 2.3), which is more detailed.

The receptive/productive distinction exists for every aspect of vocabulary knowledge. In Table 2.1, Nation lists the questions we should be able to answer (consciously or unconsciously) if we "know" a word from various aspects. There are receptive or productive knowledge for any of the various aspects of knowing a word, i.e., spoken form, written form, word parts, form and meaning, concept and referents, associations, grammatical functions, collocations.

**Table 2.3 What is involved in knowing a word (Nation, 2001, p. 27)**

| **Form** | **Spoken form** | **R** | **What does the word sound like?** |
|---|---|---|---|
| | | P | How is the word pronounced? |
| | Written form | R | What does the word look like? |
| | | P | How is the word written and spelled? |
| | word parts | R | What parts are recognizable in this word? |
| | | P | What word parts are needed to express the meaning? |
| | | | |
| Meaning | form and meaning | R | What meaning does this word form signal? |
| | | P | What word form can be used to express this meaning? |
| | concept and referents | R | What is included in the concept? |
| | | P | What items can the concept refer to? |
| | Associations | R | What other words does this word make us think of? |
| | | P | What other words could we use instead of this one? |
| | | | |
| Use | grammatical functions | R | In what patterns does the word occur? |
| | | P | In what patterns must we use the word? |
| | Collocations | R | What words or types of words occur with this? |

| Form | Spoken form | R | What does the word sound like? |
|---|---|---|---|
| | | P | What words or types of words must we use with this one? |
| | constraints on use (register, frequency) | R | Where, when, and how often would we expect to meet this word? |
| | | P | Where, when, and how often can we use this word? |

Note: In column 3, R = receptive knowledge, P = productive knowledge

Nation's table clearly explains the components of word knowledge. However, Meara (1997), Read (2000), Schmitt and Meara (1997), and Schmmitt (1998) comment that it seems unpractical to assess vocabulary knowledge according to all these components. Even though, the most important aspect of knowing a word, the meaning and form aspect which is based on the receptive/productive distinction, is widely accepted by vocabulary researchers when it comes to measure learners' vocabulary knowledge. This aspect is adopted as the measuring standard of vocabulary learning in this study.

In the following sections, the receptive/productive distinction, other vocabulary knowledge aspects, and the ways to measure if a word is learned, are examined in detail.

**1) Reception / production distinction**

Reception is commonly described as the ability one has to recognize or understand individual words, and production as the ability to produce or use them. The two terms come from earlier study. In earlier times, Palmer (1921, p. 118), West (1938), and Crow (1986), discuss about the "receptive" skills of listening and reading and the "productive" skills of speaking and writing. Meara (1990) makes a distinction between reception and production: passive items "can only be accessed if appropriate external stimulation is available (p. 153)", Productive vocabulary "does not require any external stimulus, but can be activated by other words (p. 153)" (cited in Melka, 1997, p.92). Nation (2001, p.24) proposes that the validity of the receptive/productive distinction as a way of distinguishing types of knowledge in most cases depended on its resemblance to the distinction between the receptive skills of listening

and reading and the productive skills of speaking and writing. “Receptive” carries the idea that we receive language input from others through listening or reading and try to understand it, “productive” that we produce language forms by speaking and writing to send messages to others. Nation (2001, p.24-25) describes receptive vocabulary use as concerning perceiving the word form while listening or reading and retrieving its meaning, and productive vocabulary use as concerning wanting to express a meaning through speaking or writing and retrieving and producing the proper spoken or written word form.

There are lots of expressions describing the two notions of reception and production, such as “understanding vs. Speaking”, “comprehension vs. production”, and “recognitional vocabulary vs. actual use”, etc. The commonest one is “active vocabulary vs. passive vocabulary”. Many researchers, such as Meara (1990), Laufer & Paribakht (1998), use the terms ‘passive’ and ‘active’ interchangeablely with productive and receptive.

**1) Importance of receptive/productive distinction**

There are several aspects of receptive/ productive distinction according to Nation (see Table 2.3). In this study, one aspect of the receptive/productive distinction for vocabulary knowledge, meaning and form, was adopted for the measurement and assessment of vocabulary gain and retention. The receptive/productive distinction from meaning and form aspect are widely accepted by researchers. They stand for the two stages/thresholds in the process of mastering a word.

According to Ellis (1995), to learn a new word, minimally it must be recognized as a word and entered into mental lexicon by learners, then “several lexicons are specialized for different channels of Input/Output”. First, a novel sound pattern (which will be variable across speakers, dialects, etc.) must be categorized into the auditory input lexicon to understand speech. To recognize it, a new orthographic pattern (or, in an alphabetic language,

grapheme-phoneme correspondences are to be exploited in order to access the phonology and hence match the word in the auditory input lexicon) must be learned into the visual input lexicon in order to read the word. The speech output lexicon must tune a motor program for its pronunciation in order to say the word. Finally, the spelling output lexicon must have a specification for its orthographic sequence in order to write it.

The receptive/productive distinction is related by Nation to the pedagogical conceptions of the receptive skills of listening and reading and the productive skills of speaking and writing. The receptive process is the way a learner retrieves and understands the meaning of a word when he/she is exposed to written or oral input. And the productive distinction is the process of retrieving and producing the appropriate written or spoken language form to get meaning across. Schmitt (2000, p. 47) also claims the same idea: “word recognition in reading is the receptive process dealing with written word form, whereas spelling is the productive side.” He points out the importance of the written and spoken form of a word as being “among the most essential of the different kinds of word knowledge”, “because without being able to recognize or produce a word, any other kind of knowledge is virtually useless”. The written form or orthographical knowledge is a key component to both vocabulary knowledge and language processing in general.

Learners need to pay more attention to meaning and form connection of a word in order to master it. Usually, language learners tend to judge his mastering of a word by knowing its meaning or not. Thus the most common way to evaluating the “knowing” of a word, is by the meaning and form connection. The receptive/productive distinction between form and meaning will be regarded as the judging standards for learning a word in this study. Nevertheless, we are going to deal with written form only in this study.

**2) Aspects of vocabulary knowledge and the continuum view**

Knowing a word is not an all-or-nothing proposition. It is so complicated and contradictory that there are no agreed standards for judging it. Most researchers use a dichotomy between reception and production to show the mastering of a word as what is mentioned in the former section. Basically, researchers accept receptive/productive distinctions from the perspective of form and meaning, but different researchers have different says towards vocabulary knowledge from other aspects. The process of word knowledge gaining (also called word familiarity) is viewed as a continuum by many researchers. Reception and production can be seen as being on the continuum.

According to Ellis (1995), besides the mastering of meaning and form, we must learn a word's syntactic properties. We must learn its place in lexical structure: its relations with other words. We must learn its semantic properties, its referential properties, and its role in determining entailments. We must learn the conceptual underpinnings that determine its place in our entire conceptual system; and finally must learn the mapping of these I/O specifications to the semantic and conceptual meanings.

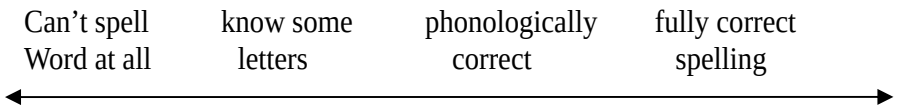
Nation (1990, p.32) claims that "knowing a word also includes being able to see which shade of meaning is most suitable for the context that it occurs in; knowing the meaning of a word may include being able to make various associations with other related words; knowing how to use it in correct grammatical patterns along with the words it usually collocates with; knowing not using the word too often if it is typically a low-frequency word, and using it in suitable situations; and knowing using the word to stand for the meaning it represents and being able to think of suitable substitutes for the word if there are any."

In explaining vocabulary knowledge, Cronbach (1942, as cited in Bogaard, 2000, p. 491), Laufer & Paribakht (1998, p. 368) gave a more complicated explanation from the aspect

of form and meaning. Cronbach, proposed five aspects of vocabulary knowledge: “generalization (knowing the definition), application (knowledge about use), breadth of meaning (knowing different senses of a word), precision of meaning (knowing how to use the word in different situations) and availability (knowing how to use the word productively).” The proposal of Laufer et al. for the different dimensions of lexical knowledge includes “form (Phonological, graphic, morphological), syntactic behavior, meaning (referential, associative, pragmatic) and relations with other words (paradigmatic and syntagmatic)”.

The knowing of a word is viewed by some researchers as a continuum, too. Incremental is the common feature for word learning, especially for word learning through reading. Melka (1997) regards knowing a word as a continuum where knowing a word follows different steps before being internalised and used appropriately by the learner. Melka (p. 88) points out that “the idea of familiarity or degrees of knowledge could be considered as a measurement concept, … starting with the most elementary knowledge: the first encounter with a word, the visual recognizing of (part of) a word in a context, its length, for example.” The degrees of knowledge, which could be labeled as “higher” degrees of familiarity, are close to productive knowledge, “having phonological, morphological, syntactical and lexical information about an item”.

Henricksen (1999) describes the various aspects of incremental development while discussing vocabulary knowledge. She proposes three dimensions of lexical competence: partial to precise knowledge, depth of knowledge, and receptive to productive use ability. According to Henricksen, learners can have knowledge ranging from zero to partial to precise for any lexical aspect. This indicates that all word knowledge ranges on a continuum, rather than being known versus unknown. Even knowledge as seemingly basic as spelling can range on a cline something like this:




Schmitt (2000, p. 117) points out "complete mastery of a word entails a number of component types of word knowledge, not all of which can be completely learned simultaneously". It proves that that some word knowledge are mastered before others. For instance, learners will master a word's basic meaning sense before they have the competence of collocation. It is true that certain word knowledge aspects are mastered before others at any point in time when the degree is not arrived at the point of full mastery of the word.

Merea (1997, p. 118) has suggested that the "continuum" view implys a one-dimensional space with simple measurable properties that vary systematically in a linear fashion, however, the "passive/active continuum" does not seem to share these properties at all. Passive/active continuum is actually discontinuous, and some words are able to hop onto the continuum (at the minute when their meanings are known), move around on it (more and more knowledge of the word are learned), and (presumably) disappear from it (at the minute when the word is forgot by the learners). Anyway, the "continuum" view is quite controversial in some sense.

**4) Word learning measuring methods**

To measure whether a word was learned was one of the major focuses in this study. Knowing a word involves many aspects: phonological, morphological, syntactical and semantic information. There is no standard way to illustrate vocabulary knowledge of a word incremented with time and there is no standard way to measure it. Although there are several ways to test word knowledge, some are still under dispute, and some are not well accepted. Usually learners themselves judge knowing a word or not by if they can tell its meaning at the sight of it while reading and by if they can spell the word correctly while writing. This is in

concord with the reception/production distinction, which is broadly accepted by vocabulary researchers. This symbolizes the two comparatively important advances in the process of mastering a word. In this study, we adopt the reception and production distinction from the meaning and form perspective to assess the learning of a word. Despite the incremental nature of the process for learning words, the two symbolized achievements of meaning (the meaning from the context) and form are representative measure for vocabulary gain.

Firstly, other practical ways of testing vocabulary knowledge of a word are discussed below.

**(1) Self-assessment and Vocabulary Knowledge Scale**

The two methods are quite subjective for measuring vocabulary knowledge.

An early account of a self-assessment method of testing vocabulary is provided by Ebbinghaus (cited in Schmitt, 2000). Similarly, Paribakht and Wesche (1993) developed a Vocabulary Knowledge Scale (VKS) attempting to capture stages of knowledge or the diverse degrees of knowledge of words. It starts from the first stages of recognition (more or less receptive knowledge) and reaches a more complete knowledge nearing P knowledge (cited in Melka, 1997, P. 98-99). Paribakht and Wesche (1997, p. 179) described VKS as an instrument using a 5-point scale by combining self-report and performance items together to elicit self-perceived and demonstrated knowledge of specific words in written form. The scale ratings range from total unfamiliarity, through recognition of the word (the spelling form) and some idea of its meaning, to the ability to use the word with grammatical and semantic accuracy in a sentence. Researchers who favor VKS holds that VKS scale differences are large enough to be self-perceived yet small enough to capture gains during relatively brief instructional periods. Anyhow, these tests adopt a self-assessment method, which fails to provide objective judgment.

**(2)Testing four types of knowledge**

Laufer, Elder, Hill and Congdon (2004) distinguished four degrees of knowledge of meaning, based on two dichotomous distinctions: a) supplying the form for a given concept vs. supplying the meaning for a given form; and b) recall vs. recognition (of form or meaning). The four types of knowledge are active recall; passive recall; active recognition; passive recognition. This test provides four degrees of vocabulary knowledge between meaning and form for a word. It is a quite detailed way to test word knowledge from the aspect of meaning and form than the widely accepted receptive/productive distinction by using only two scales: recognition and recall. However, Meara (1997, p. 112) criticizes vocabulary gains measured by using multiple-choice recognition test (to test recognition recall) as being “probably very generous to learners” sine it “allows them to demonstrate vocabulary gains very easily”.

**(3)Testing knowledge of many aspects**

Webb (2007) paid attention to more aspects of a word than Laufer did, such as knowledge of orthography, association, grammatical functions, syntax, and meaning and form, each of them are tested from two sides, receptive or productive. Nevertheless, some of the ways to realize the measurement are questionable, e.g., the way to assess vocabulary knowledge for association etc. It seems to assess the degree of mastering a word by measuring every aspect related to a word is quite complicated and problematic.

All in all, there are different opinions towards the measurement of word knowledge. Luckily, most of researchers accept the distinction of receptive and productive knowledge. This study only involved the reading context, and nothing related to spoken language was to be dealt with. In this study, reception was related with reading and recognition, while production with writing and recall. Thus, recognizing the meaning of a new word showed the master of its receptive knowledge and writing the target word by its meaning showed that of its productive knowledge.

**(4) Testing receptive knowledge and productive knowledge from meaning and form aspect**

Receptive word knowledge is the word knowledge needed to perceive the form of a word and understand its meaning while reading or listening. As Ellis and Beaton (1993: 548-549) suggest, a new foreign language word in the early stages of learning has only one simple link to its first language (L1) translation (the receptive direction) (cited in Nation, 2001). The receptive direction is from a foreign word to its L1 translation.

The receptive direction: a foreign word -------＞ L1 translation

The opposite direction is the productive direction. Productive word knowledge is what a learner needs to know about a word in order to use it appropriately in speaking or writing. The production direction is from the meaning of a foreign word to the word itself (or its spelling form).

The production direction: the L1 meaning -------＞ the foreign word (Nation, 2001, P. 29)

However, the L1 word has many similar associations (the productive direction) and thus productive recall is more difficult than receptive because there are many possible and competing paths to choose from.

According to Waring (1997, p. 99), to demonstrate ‘receptive knowledge’ of a word, the subject must be able to provide a specific L1 translation of the English word, but to demonstrate ‘productive knowledge’, the subject must offer a specific L2 equivalent for the L1 word.

The way testing receptive knowledge and that of productive knowledge in this study is based on the link between meaning and form. This distinction is operationalized by receptive test and productive test. The receptive test is to show the receptive knowledge of a target word by the ability to write its L1 translation.

The receptive test: see a target word -------＞ write its L1 translation

The productive test is to test if a learner can retrieve or not the written form of the word when seeing its L1 translation.

The production test: see a L1 translation -------＞ write the target word

In the vocabulary test in Laufer and Hill's (2000) study, subjects were asked to write the meaning of the 12 TWs listed in isolation in L1 or L2.

Peters (2007) measured the subjects' vocabulary retention by four receptive vocabulary tests, two recognition tests and two recall tests, to capture partial vocabulary retention. The first recognition test is "lexical noticing test" with 40 word forms being asked if appeared in the text or not. The two recall tests are distinguished by if the TWs appear in sentence contexts or not. The second recognition test is a matching test.

In this study, a receptive test will be used to test the effects of the EBEVOL Model. For other unknown words, only the receptive test is to be administrated, too. It is unlikely that learners would master the spelling knowledge of other unknown words; however, there is some chance for the students to obtain the spelling form of the TWs after the treatment. Therefore, a productive test is to be administrated to explore if it is possible for the participants to learn the spelling form of the TWs.

## 2.2 Variables

Several studies have been carried out to investigate EFL learners' dictionary lookup behaviors. The recent researches show various variables related to them. In this part, the variables are grouped and analyzed. Except for the variable of vocabulary gain and retention, other variables fall into four classes: dictionary variables, task variables, text variables, and reader variables. In this study, the learners were also called readers.

### 2.2.1 Dictionary variables

There were two **dictionary variables,** dictionary types in terms of the language they use and multimedia annotation (picture /motion/ sound). In terms of the language used for Chinese learners, there are English to English (monolingual) dictionaries, English to Chinese (bilingual) dictionaries, and English to both English and Chinese (bilingulized) dictionaries. Except semantic explanation, the dictionary information can be demonstrated in a digital version by multimedia annotation: images, video, and audio. Bilingual dictionaries are the preferred dictionary type in terms of the language by many Chinese learners. A bilingual dictionary was chosen as the dictionary to provide dictionary information in this study and L1 semantic explanations of a word and its part of speech were provided. The reason not to provide examples in this study is was to avoid introducing an extraneous variable because some students may choose to read the example while some may choose to ignore the examples.

**1) Types of dictionary**

There are three major types of dictionaries in terms of the languages: monolingual, bilingual, and bilingualised. Monolingual dictionaries are written in the target language. An English monolingual dictionary has an English headword, an English definition, and English examples and other English information. For some monolingual dictionaries, to interpret definitions and other information simple in the target language, the definitions are usually written with a controlled vocabulary. Bilingual dictionaries use two languages, the target language and the mother tongue (for most learners). The headword and the examples are in the target language and the meaning is in another, learners' mother tongue. The example sentences are usually provided in the target language. The third type, termed as 'bilingualized' dictionaries by Laufer and Melamed (1994), refers to the dictionaries containing the information that is in a monolingual dictionary plus a translation of the headword.

Laufer and Hill's study (2000) compared what dictionary information students consulted and found 72% Israeli students looked up L1 translation; 38% Hong Kong students looked at L2 explanation and L1 translation at the same time and 32.5% Hong Kong students only English meaning. The highest vocabulary retention scores are associated with consulting both languages for the new words.

It seems different types of dictionaries are suitable for different learners. For the advanced learners, monolingual or bilingualized dictionaries help them most while for the less advanced learners, they like bilingual dictionaries better. Therefore, a bilingual dictionary was chosen as the right dictionary to provide word explanations for the TWs in this study.

### 2) Multimedia annotation

With the applying of computer technology in the teaching and learning activities of vocabulary, many researchers have made use of audio and video technology and tested the effect of multimedia annotation (glosses) on learning of difficult words. Some studies on the effects of multimedia glosses on vocabulary learning (Al Seghayer, 2001; Chun and Plass, 1996; Chun and Payne, 2004; Kost et al.. 1999; Plass et al., 1998; Siribodhi, 1995) found that L2 vocabulary was remembered better when learners looked up picture or video glosses in addition to translations of unfamiliar words than looking up translations alone. Other studies (Chun, 2001; Davis and Lyman-Hager, 1997; Karp, 2001; Laufer and Hill, 2000; Laufer and Kimmel, 1997; Lomicka, 1998, cited in Chun and Payne, 2004) have found that when learners are given a choice to look up word translations or definitions and other multimedia annotations, they look up predominantly translations. Liu (1995) studied how learners accessed computer-based aids and also found that word definitions were the most frequently accessed contextual aid. Chun and Plass (1996) found the learners had strong tendency to look up English translations of words even when provided with multimedia annotations while reading.

Although multimedia annotations are beneficial to new word learning with word definition, it is unpractical to design a multimedia dictionary for all of or most of the words in a language. It is difficult to express the abstract ideas or concepts by pictures or videos. Meanwhile, the learners, as the user of dictionary, prefer word definition most. Therefore, in this study, word definition was chosen as the dictionary information.

### 2.2.2 Task variables

A relevant task is found an indispensible factor in researches on the effects of LUB on vocabulary learning. It was found that words being looked up in a dictionary during a reading task were remembered better than words that not being looked up (Cho & Krashen, 1994; knight, 1994b; Luppesku & Day, 1993) or than word being glossed in text margin (Hulstijn, Hollander, & Greidanus, 1996; Jacobs, Dufon, & Fong, 1994; Watanabe, 1997). Since learners do not have a tendency to look up all of the new words, certain tasks are necessary to make learners elaborate the target words out the purpose of learning vocabulary.

For investigating the effects of a dictionary on vocabulary learning, the four **task variables** are important, that is, presence/absence of task, mode of task (reading/writing). Word relevance and word-focused vocabulary task, the two effective enhancement techniques as two task variables, will be explored, too.

**1) Presence and absence**

In investigating vocabulary learning, “reading” alone is found not sufficient to direct readers’ attention to new words even with an e-dictionary provided which is very convenient. Learners may just try to guess the meaning of a new word if it is possible to guess the meaning by using the contextual clues or they may just choose to ignore the word if they fail to make out its meaning from the contextual information. In order to ensure the occurrence of LUB, one important task variable, *the presence of task* must be introduced to lead readers’ attention to

new words and elaborate them. Most of researchers (such as Hulstijn, 1993, 1996, 1998; knight, 1994; Laufer, 1997, 2000, Chun and Payne, 2004, Peter, 2007, 2009) required learners to complete a “comprehension test” or “comprehension exercises” while or after reading a text. Without knowing the meaning of certain words, it is impossible for them to answer the questions correctly. Some studies made students look up new words by requiring them to write. Writing is another form of task researchers made use of. Apart from RC task, vocabulary exercises/word-focused activities were introduced as a repetition task to help learners learn vocabulary (Peters et al. 2009), which were found an effective task in a “Reading Plus” condition.

**2) Mode of reading and writing**

Usually, researchers ensure the dictionary consultance by the presence of the two tasks: ‘reading to answer comprehension questions’ and ‘writing alone’. Reading tasks and writing tasks are the two commonly adopted modes of tasks for vocabulary gain.

Hulstijn & Trompetter (1998) compared the retention of the looked-up words under two conditions of text processing, reading and writing. The results showed that there was almost no difference between the numbers of words looked up by readers and by writers, but writers spent more time than readers did. Although writers achieved higher retention, no conclusion could be reached because some words students looked up and tested are not same during the completion of their reading or writing task. Different tasks (reading or writing) hardly affect the number of words looked up, but affect the degree of retention of the words looked up.

In fact, reading comprehension tasks may adopt the mode of reading or the mode of writing depends on what kinds of answer are required by reading or by writing. Peters (2007) made the subjects answer the RC question written in L1 in order to make them look up the words.

**3) Word relevance**

*Word relevance* refers to the fact that the exercises, e.g., reading comprehension questions, are relevant to the target words. Without the knowledge of TWs, learners cannot answer the questions correctly. The purpose of the use of reading comprehension questions are to create the need of knowing the meanings of the target words for readers. The word relevance makes readers look up the target words rather than ignore it. It is the key of a RC task.

Hulstijn (1993) has found that learners LUB is clearly influenced by perceived word relevance. She found that words regarded as relevant to the goal of reading were looked up more frequently than words regarded as irrelevant. She also points out the fact that even there was enough time and there existed the ease and quickness of consulting an electronic dictionary, the FL readers did not look up all new words, not even all of the relevant words.

Peters (2007) explored the effects of one enhancement technique, e.g., Task-induced Word relevance, on L2 learners' lookup behavior during a reading task and word retention afterwards. The Task-induced Word relevance is similar to the term "word relevance". It is operationalized by a reading comprehension task. The relevance factor comprised two levels: plus-relevant and minus-relevant target words. Peters found a significant effect of Word relevance on whether a target word was looked up and on the frequency of clicks on target words. Moreover, word retention, which was durable, was found only influenced by Task-induced Word relevance.

**4) Vocabulary task**

A vocabulary task is used to lead learners' attention to words while reading a text. It is a word-oriented task. A vocabulary task is composed of the vocabulary exercises or what Laufer (2001b) called word-focused activities. Its importance was expressed by Laufer (2001) that "in order to acquire a word without attempting to commit it to memory, word-focused activities are recommended." It is a means of increasing vocabulary. In Paribakht and Wesche's (1997) study,

the ‘reading plus’ group acquired significantly more words than the ‘reading only’ group. In Peters et al.’s (2009) study, vocabulary task was found substantially affecting word retention in the recall posttests. Therefore, vocabulary task can be an effective tool for learning vocabulary in a condition of “e-dictionary +Reading Plus”.

In the present study, word relevant RC tasks and a type of vocabulary task are to be used to induce the participants to look up and learn the target words. Word relevance is one of the most important conditions for this experiment, which determines the creating of “need” to look up the new words and the creating of the conditions required for the occurrence of “retrievals”. The vocabulary task is to ensure the occurring of “retrieval”. The forewarned T/F RC test is to be designed to be similar as a recall protocol for which the subjects are instructed to read for meaning and then retell the text in detail in their mother tongue. This reading purpose makes learners understand the text thoroughly and pay attention to words obstacling their comprehension, therefore, the need to know the unknown words are created for the participants. In this way, the effects of dictionary on vocabulary learning can be demonstrated from the learning of target words and other unknown words to each subject as well. To avoid confusion, word relevance is referred to as while-reading word relevance.

The vocabulary task in this study is a matching task in which the written form of the TWs is the answer to match their meaning appeared in the question. It is different from the vocabulary task in the study of Peters et al. (2009), in which learners were required to provide an L2 synonym /definition or an L1 translation of the target words presented in the sentences as they had occurred in the text.

### 2.2.3 Text variables

With the using of a RC task, text is introduced in studies on dictionary use. **Text variables** related to dictionary LUB while reading include helpfulness of context clues, number

of context clues, and text difficulty from the lexical perspective. They three give a clue about the extent to which the meaning of a new word can be guessed from context and about how difficult a text from the lexical perspective is. Context may offer clues for learners to guess the meaning of the new words. Some clues make the guessing easier. The helpfulness of context clues refers to the extent a clue helps learners to make out the meaning of the word. As every sentence offers learners a context clue to guess the meaning of a new word, the times the word appears in the article stands for the number of its context clues if no same clues reappear. Text difficulty is a variable containing many aspects of a language. In this study, only word factor was concerned. New words percentage and how difficult the new words are count much for text difficulty. The proportion of the number of new words to the whole running words give a clue about how difficult a text might be, as well as the difficulty level (high frequency or low frequency) of the new words.. Text difficulty of a same text is different to different learners with different language proficiency. For an objective judgment, the program *Vocabulary profile* can reflect the distribution of high frequency words and low frequency words in a text. Vocabulary profile can serves as an indicator of the difficulty of a text.

**1) Helpfulness of context clues**

Nation & Coady (1988) describe context as morphological, syntactic, and discourse information in a given text, which can be classified and described in terms of general features. Nattinger (1988) proposes the importance of context for meaning guessing of a new word. Guessing vocabulary from context is the most frequent way we discover the meaning of new words, and for that, we have learned to look for a number of clues. “Discourse is full of redundancy, anaphora and parallelism”, and each offers clues for understanding new vocabulary. Contextual information creates conditions for learners to infer the meaning of a new word. However, the information it contains decides the helpfulness of the clues. Webb (2007) rates

contexts according to four scales: no contextual clues and may be misleading; the context may lead to partial knowledge; can infer the meaning but have many choices; and can infer the meaning correctly.

How much information is provided in the context determines the possibility of whether a reader can infer the meaning of a new word. Therefore, readers LUB are inversively related with the degree of helpfulness of context. Chun and Payne's study (2004) found that words whose meanings could easily be inferred from contextual clues were looked up less frequently than words whose meaning could not easily be inferred.

**2) Number of context clues**

From Webbs' (2007) classification of context, we can make out that it is unlikely a reader may guess the meaning of a new word correctly only upon one encounter. The number of context clues account for the frequency of target word encounter. When readers fail to infer the meaning, the availability of a dictionary offers an alternative. Number of context also hints the potential frequency of lookup, which is determined by learners. Laufer and Hill (2000) have found that multiplicity of lexical information tends to be associated with better retention.

In this study, the appearance frequency of the target words were all one time to decrease the possibility of guessing the meaning from context. This makes the help from a dictionary necessary for the participants.

**3) Text difficulty from the lexical perspective**

For a learner, the difficulty of a text mainly depends on how many new words it contains from the lexical perspective and how frequent these new words are used. If there are too many new words, especially low-frequency new words in it, it is very difficult for a learner to understand the text and even with the convenience of an e-dictionary. Chall (1958) and Klare (1974) claim that vocabulary difficulty has consistently been found to be the most significant

predictor of overall readability in measures of readability of a text. Marks et al. (1974) found that replacing 15 percent of the words in a reading text with low frequency words led to a significant decrease in comprehension. Kameenui et al. (1982) found that ratios around one low frequency word in fourteen running words (7%) made reliable decrease in correctly answering inferential questions based on the text. If there are many new words in a text, the learners may lose interests in exploring the meaning of these words. The number of new words, especially low-frequency new words, in a text may affect the occurrence of LUB.

How frequent a word is is usually judged by word-frequency lists. The word-frequency lists are lists of chosen words out of their frequency count. Usually a vocabulary count is done by making a list of the words in a particular text or group of texts and counting how often and where they occur. There are different word lists, such as, 2000 high-frequency words, 800 academic vocabulary, and 123,000 low-frequency words, etc. West's (1953) *A General Service List of English* is the classic list of 2000 high-frequency words (cited in Nation, 2001, p. 11). The Academic Word List (Coxhead, 1998) is the best list for academic words (cited in Nation, 2001, p. 12).

As an indicator of vocabulary profile, the online program "vocabulary profiler" may provide some information about the text difficulty. Cobb (1997) has created the program to assort all of the words in a text (no matter high frequency or low frequency words) into five lists:

1. List of the most frequent 1000 words,
2. List of the most frequent 1001 - 2000 words,
3. Academic Word List (AWL) (Coxhead 1997),
4. Remaining words in Xue and Nation's (1984) University Word List not included in the AWL, and
5. Words that do not appear in any of the preceding lists.
   (see: http://www.er.uqam.ca/nobel/r21270/textools/web_vp.html)

From the word lists the text contains in each of the five frequency levels, a sound judgment is provided for how difficult a text is for certain learners.

### 2.2.4 Reader variables

The qualities and characteristics of reader are reader variables, including learners' attention/noticing, inferring ability, vocabulary knowledge, lookup preferences, working memory and lookup frequency.

#### 1) Learners' attention/ Noticing

The learner's *attention* to a new word may be the first step for him to learn it. Without learner's attention, no words may be noticed and learned. The importance of attention (or noticing) lies in coming before elaboration strategies for vocabulary learning, which leads to deeper processing of word information. Attention/Noticing, as an important variable in this study, has been dealt with in detail in Section 2.1.1 of this chapter. Here one more aspect is going to be discussed, the limitation of attention objects. Learners can acquire some unfamiliar words in the process of reading but not all of them. Learners' attention can be either on reading or on new words. The acquisition of words often draws learners' attention away from reading. If there is no focus of attention to a word, in the form of either written or spoken, no acquisition will occur. The concept of attention should be involved in both the existence of attention to the form and the attention to the meaning of the message. Wang Miao (2004) suggests that during intentional learning with the learner's attention focused on the formal features of the word (spelling and pronunciation), little semantic, syntactic, and morphological information was created and established within the lexical entry in the process in the learner's mind.

#### 2) Inferring ability

For vocabulary learning, readers' inferring ability concerns making use of the context clues in order to guess the meaning of a new word. Rich contextual clues provide readers

opportunities of guessing the meanings of new words. However, learners' inferring ability is as important as the degree of richness of contextual clues for the success of meaning guessing. Usually, learners with great inferring ability can guess correctly the meaning of words by using context clues, thus learn more words and learn words in a quicker way while learners equipped with poor vocabulary. The latter may guess a lot but with low correct rate.

Hulstijn (1993) used computers to observe foreign language (FL) readers' lookup behavior of pseudo-words while reading a part of a novel. The reading task was followed by an inferring ability test and an English language vocabulary test. She found learners LUB was not influenced by reader's ability to infer word meanings from contextual information. Students with higher inferring ability did not look up fewer words, not even the minus inferable (whose meaning is difficult to infer) nor the minus relevant words (which did not affect the understanding and answering to the comprehension questions) than students with lower inferring ability did. The readers with good inferring skills might consult a dictionary to verify their meaning inferring of a new word while readers with poor inferring skills looked up new words in a dictionary to find out their meaning.

**3) Vocabulary knowledge**

The third variable, learner's vocabulary knowledge, is all of his acquired knowledge of vocabulary. It includes all of the words he mastered receptively and productively and every aspect he knows about any of the words in his mental lexicon. Learners with low language proficiency are generally equipped with less vocabulary knowledge than high proficiency learners are. Vocabulary knowledge seems to be the most clearly identifiable subcomponent of learners' ability to read. There exist the effects of vocabulary knowledge on reading and then reading increases vocabulary knowledge.

Hulstijn (1993) found learners' LUB was modestly influenced by reader's vocabulary

knowledge. Students with greater vocabulary knowledge usually looked up fewer words than students with smaller vocabulary knowledge did. This might be due to the former knew more words in the context, therefore could make out the vague or exact meaning of a target word. They are quite confident about the guessing that they did not look up the meaning in a dictionary.

**4) Lookup preferences**

The fourth variable, learner's lookup preferences, refers to what type of dictionaries he prefers to use for looking up a new word in terms of the language the headword is explained in the dictionary. A learner may prefer a monolingual, or a bilingual, or a bilingualized dictionary. This has been discussed extensively in the section of dictionary types (See Section 2.2.1). Although different learners have different preferences towards the dictionary types, it is obvious that most of the learners preferred the bilingual dictionary most. Davis and Lyman-Hager's (1997) studied on multimedia glosses in French reading and found almost the subjects chose exclusively word definitions provided in L1 for reference (cited in Laufer and Hill, 2000). Aust, Kelley, and Roby (1993) noted that bilingual dictionary users consulted 25% more definitions than monolingual dictionary users. Bilingual dictionary is chosen as the dictionary type in this study.

**5) Working memory**

The fifth variable, learner's *working memory*, refers to a cognitive system responsible for temporary storage and manipulation of information during cognitive activities (Numminen, Service, Ruoppila, 2002). Working memory is an important aspect showing individual difference among learners. Working memory may exert certain function in the process of word learning. It may be a predictor of learners' proficiency. Phonological component of working memory is a source of individual variation that directly influences the ease of word learning.

Gathercole and Baddeley (1989) indicate that learners' ability to keep a word in their phonological short-term memory is an important factor influencing word learning (Cited in Nation, 2001, p. 42). According to Cheung (1996), Service (1992) and Service and Kohonen (1995) (cited in Chun and Payne 2004), "PWMC has been shown to be an effective predictor of language acquisition and vocabulary development for children learning English as a Foreign Language".

Chun and Payne (2004) reported a study investigating the relationship between working memory capacity and vocabulary acquisition by tracking 13 students' look-up behaviors while reading a German short story on a multimedia CD. Their working memory capacity was assessed by a nonword repetition test and a reading span test. The phonological working memory, measured by the recognition-based nonword repetition test was found strongly related with learners' lookup behavior. Those students with lower PWM capacity looked up more words. However, no relationship was found between reading span memory and multimedia look-up behavior. This might be due to that reading span is generally correlated with comprehension but not necessarily with vocabulary learning.

**6) Lookup frequency**

The last variable related to reader is their lookup frequency. It is a very important variable in studies on LUB. *Lookup frequency* is the number of times a learner looks up a new word in a dictionary. With the appearance of electronic dictionaries, researchers can make use of a computer program to track the number of 'clicks' (selection) on the target word. This provides an unobtrusive research instrument for vocabulary learning.

Usually, the number of clicks is checked for the correlations with learners' retention score of target words. People may assume that higher lookup frequency should lead to higher vocabulary gain. According to Knight (1994), the number of words looked up is correlated with

vocabulary recall scores for high and low verbal ability groups. However, Laufer and Hill (2000) only discovered a weak relationship between the number of selection and retention. They found that the number of times the word was looked up during a learning session bears almost no relation to its retention. Laufer and Hill (2000) argue that what matters is greater attention during the lookup rather than the number of lookups. Therefore, task, whose function is to draw learner's attention to target words, is of importance to studies on vocabulary learning. At the same time, the duration of lookup behavior or the length of each click may play a role in learners' vocabulary gain.

Nevertheless, the relationship between the learners' lookup behavior and vocabulary learning is still inconclusive. It is one of the aspects to be investigated in this study. What is more, learners' lookup behavior offers important observation on the process of vocabulary learning.

### 2.2.5 Vocabulary gain and retention

Looking up words in dictionary leads to certain vocabulary gain. As Laufer and Hill (2000) claim, the use of an electronic dictionary has a positive effect on incidental vocabulary learning while reading. Laufer and Hill compared several studies in this field, from which we can see the benefits of dictionary or glossing. Mondria's (1993, cited in Laufer and Hill, 2000) learners remembered 15% of them (out of 14 target words from 14 sentences) on a post-test after looking up new words in a dictionary. Knight's (1994) subjects recalled 20% of the tested words (out of 14 target words not highlighted in a 250-word text). In Hulstijn, Hollander, and Greidanus' study (1996), learners remembered 25% of the looked up words (out of 16 target words not highlighted in a 1306-word text) when the word appeared in the text once. Chun and Plass' study (1996) reported 25% accuracy in production tests and 77% on recognition tests. Moreover, in Laufer and Hill's study (2000), the Israeli group remembered 33.3% of the words

(out of 12 highlighted target words in a 120-word text) by writing their meaning, the Hong Kong group, 62%.

The final variable and the most important variable is *vocabulary gain and retention*. It tests what a learner has learned about a target word. It includes the four vocabulary tests for vocabulary knowledge in two stages (immediate tests and delayed tests) and in two kinds of vocabulary tests (receptive tests and productive tests). Vocabulary gain is the learners' immediate performance in one receptive tests and one productive vocabulary test. These tests test the participants' ability of writing the meaning of a target word at the sight of the word and the ability of spelling the word at the sight of its meaning. The main effect of the EBEVOL Model is to be examined by a receptive test. Vocabulary retention was the learners' vocabulary performance at a later stage. The same tests, the receptive test and the productive test are given to the participants again after some time span.

In this study, the treatment for the learning of the TWs is different from that for other unknown words. Learners' vocabulary achievements for the two kinds of words may be different, therefore one more test is to be adopted for target words under well-designed treatment in order to capture the difference. For other unknown words besides TWs, only the learning of their meaning is to be examined.

In a word, the variable vocabulary gain and retention contains four aspects from four tests, immediate receptive test, immediate productive test Vocabulary, delayed receptive test and delayed productive test.

## 2.3 Summary

In this chapter, two basic constructs of vocabulary learning which are important for laying the essential theoretical foundation for vocabulary learning through dictionary use in this

study are introduced. They are 1) learning words from using the dictionary while reading a text; and 2) vocabulary knowledge. The first construct includes three aspects: vocabulary-learning factors related to this study, i.e., “noticing”, “retrieval’ and task-induced involvement load; fairly beneficial conditions provided by using an e-dictionary to facilitate vocabulary gain while reading; and how e-dictionary use is closely interwoven with vocabulary learning strategy.

In the second construct, the possible variables relates to LUB are grouped and reviewed with related studies to provide a quick view of what has been done in the filed of vocabulary learning by using an e-dictionary while reading.

All in all, in section 2.2, variables related to LUB are discussed, but not all of them are dealt in this study. In this study, the experimental condition is created to help learners learn new words as many as possible. The task variables are important for this study. It is both interesting and significant to investigate vocabulary learning with the convenient and handy access of dictionary under three enhancement tasks. The two word relevance tasks (the forewarned T/F comprehension test and the while-reading word relevance RC task) and a matching task are to be used to manipulate learners’ lookup behaviour for target words. The forewarned T/F comprehension test is designed for each student to learn other unknown words, too. The dictionary used in this study is a bilingual e-dictionary, which type of e-dictionary is a best seller in China.

# CHAPTER 3

# RESEARCH METHODOLOGY

This chapter presents the methodology employed in this study. It is firstly introduced from eight aspects: research design, variables, participants, materials, instruments, procedure, data collection and data analysis. Next, a complete pilot study in detail is reported. Lastly, there comes a brief introduction of the experimental phases.

## 3.1 Research design

This study followed a quasi-experimental design. The effects of the E-dictionary-based Enhancers for Vocabulary Learning Model (see Section 1.2.1in Chapter 1) on learning new words were investigated by comparing an experimental group with a control group. The three e-dictionary-based enhancers in the EBEVOL Model were the Forewarned T/F comprehension test, while-reading word relevance and a matching task. There were two word-relevance techniques used in this study. The T/F comprehension test were forewarned before reading to make participants focus on comprehending the whole text instead of only the parts related to the two while-reading tasks. The T/F comprehension test was to make participants focus on unfamiliar or new words bringing obstacles to their understanding, too. When the T/F comprehension test itself was administrated, the text was closed and no dictionary was available. It was a post-reading word relevance task. It was just called as the forewarned T/F comprehension test. Another word relevance task in this study was the reading comprehension questions to be answered by students in their mother tongue while reading the text. It was called as while-reading word relevance.

There were two necessary factors for each of the enhancers, that is, dictionary access and the questions for the task/test. Except for the questions of the Forewarned T/F comprehension test appeared as a post-reading test when the reading text and the e-dictionary were no longer available, the function of those questions for the other two enhancers was to induce students to look up relevant target words in the e-dictionary if they failed to know their form-meaning connection beforehand. When the e-dictionary was not available, questions for the enhancers alone did not compose an enhancer. Although the students in the control group were required to answer the questions for the three enhancers, without access to the e-dictionary, these questions exerted no effect on their vocabulary learning except making them guess about the words which might obstacle their comprehension. The questions for the three enhancers used for the control group, especially the two while-reading tasks, word relevance and the matching task were to control the time factor.

The effects of the E-dictionary-based Enhancer for Vocabulary Learning model (shorted as EBEVOL Model) were examined by vocabulary tests not forewarned. Its effect on learning of the meaning of target words was checked by an immediate receptive vocabulary test. Its effect on the learning of the spelling form of TWs was to be tentatively checked by an immediate productive vocabulary test, too. Moreover, its remained effects on the learning of TWs, checked after a time span, i.e., after one month in this study, was investigated by two delayed vocabulary tests which were the same as the two immediate tests. The learning of the unknown non-TWs for the experimental group was checked only by the immediate receptive vocabulary test. For the control group, only the immediate receptive vocabulary posttest was given.

## 3.2 Variables

There were two groups of variables in this study: the independent variables and the dependent variables.

**Independent variables**

The two independent variables were e-dictionary access and learners' lookup frequency.

**Dependent variables**

The dependent variable was vocabulary gain and retention. It included four aspects, i.e., the participants' scores on the four vocabulary posttests. In fact, there were four dependent variables in this study, but for convenience, they were called the four aspects of vocabulary gain and retention.

For different research questions, different aspects of the so-called dependent variable, vocabulary gain and retention were involved. Some questions only involved the participants' scores on the immediate receptive vocabulary posttest and one question involved all the four aspects, i.e., the participants' scores on the four vocabulary posttests.

## 3.3 Participants

The participants in this study were 100 non English-major graduate first-year students in a provincial university in Guizhou Province of China. They were from two intact groups taking the "English" course. They were from different majors, such as economics, statistics, accounting, management, mathematics, philosophy, etc. Most of the participants were between 22 to 29 years old. The oldest one was thirty-six. They were reported having learned English for at least ten years. There were similar numbers of females and male with slightly more females. All of them enrolled in the academic year of 2009. They were supposed not to know the target words before the study. The list of unknown words for each participant was formed according to their performance in the vocabulary pretest.

The reason to choose graduate first-year students as subjects was because of high difficulty of the text which was not suitable for all readers, especially beginners. The graduate students, as senior students, were more appropriate for this study. They had studied English for more than ten years. They had passed a nationwide standardized matriculation English test for graduate students whose level was equal to the similar level for intermediate learners or even above intermediate learners. They were supposed to be more familiar with the non-target words in the text most of which were not low frequency words. At the same time, the target words were all low frequency words and it was unlikely that they knew these words. A vocabulary pretest (see Appendix 1) was administrated before the experiment to make sure that no participant knows any target word beforehand.

According to their scores on the matriculation test, the participants were sequenced from high level to low level and distributed evenly into the two groups, the experimental group and the control group one by one, i.e., the first one in the experimental group, the second one in the control group and the next one in the experimental group etc.

## 3.4 Materials

The effects of e-dictionary use under enhancement techniques were explored by a vocabulary instruction program designed by a professional computer programmer specially for this study in order to control the experiment rigorously by reducing certain extraneous variables. The experiment program included two parts, a client and a server. The client was the platform for students to undertake the vocabulary instruction in the form of a test. The server was for the researcher. The server performed several functions, e.g., to distribute the test material to “clients” (students’ computers); to monitor the connections between the clients and the server; and to gather the data sent by the clients.

In the program, the self-designed bilingual e-dictionary provided word explanations and the word's part of speech to all of the words in the reading text. In order to control the experiment rigorously, the word definition was context-bound for the target words. From some sense, the e-dictionary in this study was with limited functions.

Most part of the study was accomplished by the program. The instruction of these TWs and other unknown words (the treatment of this study) was accomplished by the program. The program did the job of in-time unobtrusive observation for the researchers by the recording function and offered the data of learners' lookup behavior, i.e., how the dictionary was used, and the students' answers to all of the questions in the program to be analyzed later. Most of the data were collected by the program automatically and unobtrusively except for the data from the delayed vocabulary tests and Questionnaire Two, which were on paper.

The recording of the words looked up and their lookup frequency were accomplished by a cursor translation mode in order to perceive an accurate record of any word of the text which was looked up and the number of times each word was selected. When the participants moved the cursor of the mouse on any target word and clicked on it, the word explanation appeared with a small pop-up window opening at the top of the screen to show the dictionary information. All of the words looked up and the frequency each word was looked up were recorded in the LUB file of the program. With the special designed program, the participants' LUB was tracked. The LUB file of the vocabulary instruction program recorded the learners' lookup behavior while reading the text and answering the questions in the comprehension test, and how often he did so for each word.

The text to be read in this study is a part of an authentic text. It is about a funny anecdote happening when a driver gives a ride to a hitchhiker (see Appendix 2). The excerpt is about 988 words long. It was adapted a little bit from the original text, e.g., by correcting the

cockney accent by adding "h" at the beginning of words and "g" at the end. For example, *playin'* in this sentence: *"My job," he went on, "is a hundred times more difficult than playin' the piano…*" was modified into *playing*. *'ere* was modified into *here* in the sentence *"Anyone around 'ere missin' a shoelace?" he asked, grinning.*

### 3.4.1 Enhancers

Previous studies have proved that leading learners' attention to the target words and making them elaborately process them is the key of studying on learners' LUB (Laufer and Hill, 2000; Chun and Payne, 2004; Peters, 2007). In the present study, Enhancer One, the reading comprehension test in the form of a true or false reading comprehension test was forewarned to draw learners' attention to unknown words. In order to make learners focus more on the twelve target words and elaborate them, a word relevance RC task (word relevance, see Appendix 3) and a matching task (a vocabulary task, see Appendix 4) were designed as another two enhancers.

The 12 target words were for all of the participants. For each of the participants, there were more unknown words besides the target words. Each student had his own unknown word list according to his performance in the Vocabulary Pretest, which formed different learning load for him. The number of the learned words previously unknown to each participant provided more pictures to the effects of the e-dictionary under enhancement techniques.

**1) Forewarned True or False Comprehension Test**

In this study, the effects of e-dictionary use on vocabulary learning while reading were investigated. The reading goal of this task was to comprehend the text thoroughly. In this way, how unfamiliar words were looked up and got acquired could be examined.

The True or False reading comprehension test (see Appendix 5) was forewarned to all subjects in order to make them focus on all of the words which obstacled their understanding of

the text. The students were required to read the text carefully. The comprehension test, similar to a recall protocol, was composed of 30 true or false questions which was administrated at the later stage when the text was no longer available. By this way, the need was established for the students to understand words they did not know, no matter by guessing or by looking up in the dictionary. Every word they did not know was a relevant word for the comprehension purpose.

**2) Word relevance and the matching task**

These two enhancers were to lead the learners' attention to the TWs by the questions and make the learners elaborately process these words so that they could memorize them. The dictionary information was written in the participants' mother tongue (L1) in order to create conditions for elaboration. The questions in the word relevance task were in the form of short-answer questions and learners were required to answer the questions in their mother tongue in order to make sure they look up these words. The questions were all written by focusing on the target words. Without knowing the meanings of these words, the learners should not be able to answer the RC questions correctly.

The matching task in this study was a reading directed task. Without knowing the form-meaning connection of the target words, it was impossible to fufil this task. The students were required to write down the words at the sight of their meaning. It was a reinforcement task for the target words which were supposed to have been looked up by learners. In fact, the T/F comprehension test was not a test for collecting data, but as a part of the forewarned task; word relevance and matching task were exercises instead of tests.

### 3.4.2 Target words

True words instead of pseudo-words were chosen as target words for a nature-like experiment. Before carrying out the experiment, it was necessary to ensure the participants' unfamiliarity of the target words.

**1) Participants' unfamiliarity with the target words**

In order to make sure all of the target words were brand-new to every participant, the choosing of target words was based on the following two principles: be low-frequency words and proved by a word test.

First, to be infrequent enough, the target words should not be in the most frequent two thousand wordlist, nor in the academic wordlist. The output of the software *Vocabprofile* shows that the two requirements are met, and all of the target words belong to the off-list words.

These words are proved low frequent enough by the Brown Corpus, too. The Brown Corpus of Standard American English was the first of the modern, computer readable, general corpus. The corpus consists of one million words of American English texts printed in 1961. The texts for the corpus were sampled from 15 different text categories to make the corpus a good standard reference. The low appearance frequency of these target words in Brown corpus provides strong proof for being infrequent.

Second, in order to make sure all of the target words are unknown to the participants, a tentative Word Test was given to other graduate students at the same level beforehand. Only the words unknown to all these students were to be treated as the target words. The Word Test was carried out with 30 first-year graduate students in another university who were not in the name list of the participants in the experiment.

Twelve words were chosen as target words based on the Word Test. Most of the words were words brand-new to these students (see Table 3.1), they were *twerp, titchy, snort, crummy, cardsharper, flabbergasted, sapphire, stubby, hitch,* and *huffily. Hitch* was erased from the list because its meaning could be inferred from the context clue: I *hitched* up my sleeve to look at the watch on my wrist. Another two words, d*angle,* the word known to one subject and *nick* known to three students were also chosen as TW out under some consideration. In fact, it was

quite surprising that these words were known by these students. One reason might be related to their major, for example, some subjects majoring in agriculture might know one meaning of the polysemous word “nick”, “a cut in a plant or tree” which is not the target meaning of this word. Considering that the participants in the main study were from other majors that the there was little possibility for them to know these two words, *dangle* and *nick,* were still kept as target words. Another word chosen as target word was *racket*, a polysemous word with the target meaning known to none of the subject. The word “crummy” was replaced by the word “irksome” because the isolated meaning of the word “crummy” was different from its meaning in the context.

**Table 3.1 Results of Word Test (part)**

| Meaning\word | twerp | Titchy | Snort | Crummy | cardsharper | Flabbergast |
|---|---|---|---|---|---|---|
| Correct(%) | | | | | | |
| Not exact (%) | | | | | 3.3 | |
| Not know (%) | 100 | 100 | 100 | 100 | 96.7 | 100 |

| Meaning\word | dangle | Sapphire | stubby | Racket | huffily | Nick |
|---|---|---|---|---|---|---|
| Correct(%) | 3.3 | | | | | 10 |
| Not exact (%) | | | | 4.4 | | |
| Not know (%) | 96.7 | 100 | 100 | 95.6 | 100 | 90 |

(Correct=correct answer; Not exact=not exactly correct, but relate to the correct answer; not know=no answer)

Anyhow, a vocabulary pretest was still necessary to ensure the words in the target list were new to the majority or all of the participants. The students happened to know some target words would be excluded from data analysis.

The exposure frequency of these chosen target words in Brown Corpus are listed as follows to show how infrequent they are:

twerp, 0; titchy, 0; snort, 7; irksome, 1; cardsharper, 0; flabbergasted, 0; sapphire, 0; stubby, 3; huffily, 0; racket, 6; nick, 1; and dangle, 3.

The two words with comparatively high appearance frequency, *snort* and *racket* are

polysemous. They have many different usages. The meanings used in the text are comparatively infrequent.

**2) Target words chosen**

Twelve low-frequency words were picked out as target words finally. They were true words not highlighted or bolded, with one appearance frequency in the text. The explanation of these target words, together with that of other words were accessible in the reading text in the stage of reading the text and answering the questions.

True words instead of pseudo-words were used as target words in order to avoid the latter's shortcomings, such as, the malfunction of semantic clues, unnatural way of spelling, etc. The benefit of using pseudo words lies in that no vocabulary pretest is needed since there is no possibility for any of the participants to know any of the words. The benefits of true words is embodied by the statements from Stubbs (1980, cited in Schmitt 2000, p. 48) "the English spelling system, although it is not optimal, is reasonably systematic, and even some of its irregularities have a functional purpose".

A covert way was adopted for the introduction of the TWs by word relevance and the matching task. All the target words in the program were not highlighted or bolded in order to avoid leading learners' attention merely to TWs that other unknown words would be ignored. At the same time, this was to avoid intentional artificial condition of "noticing" and making the participants consult these words too often which do not result in any significant vocabulary gain (De Ridder, 2002; Peters, 2007).

When reading the article or answering the questions with text available, learners could look up any word they do not know in the text. Nevertheless, in the next stage, the test stage containing surprise vocabulary tests, the purpose was to measure about word gaining, thus the dictionary function was no longer available.

In this study, there were brand-new target words unknown to all of the participants and other unknown words besides the TWS to each participant. The two types of words were under different treatment from different tasks. The relationship between the words and treatment was shown as Table 3.2.

**Table.3.2 Treatment for the target words and other possible unknown words**

| | | T/F comprehension test | | (while-reading) word relevance | | Matching task | |
|---|---|---|---|---|---|---|---|
| | | Questions (later) | **e-dict. access** | Questions | **e-dict. Access** | questions | **e-dict access** |
| **Experimental group** | all TWs | + | **+** | + | + | + | + |
| | ows | + | **+** | -- | -- | -- | -- |
| **Control group** | all TWs | + | **--** | + | -- | + | -- |
| | ows | + | -- | -- | -- | -- | -- |

Notes: all words=all unknown words; "+"=plus relevant; "--"=minus relevant; "ows"=other words

## 3.5 Instruments

Three types of instruments were used to collect data. They were five vocabulary tests, the LUB file of the vocabulary instruction program designed specially for this study, and two questionnaires, a five-scaled Likert questionnaire and an open-ended questionnaire for investigating learners' reaction to the program.

Except for the three types of instruments mentioned above, there were the questions for the three enhancers, i.e., the T/F comprehension test, while-reading word relevance and the matching task, involved in the study, which were not the direct instruments to collect data.

### 3.5.1 Five vocabulary tests

The five vocabulary tests were the Vocabulary Pretest, two immediate vocabulary posttest and two delayed vocabulary posttests.

How the learners learn vocabulary by consulting the dictionary was measured from two aspects: 1) by the comparison of the Vocabulary Pretest firstly to vocabulary immediate

receptive posttest and then to vocabulary delayed receptive posttests; 2) by learners' achievement in immediate vocabulary productive test and the delayed vocabulary productive test. Learners' vocabulary gain was shown from the immediate vocabulary posttests and learners' vocabulary retention was shown from the delayed vocabulary posttests.

**1) Vocabulary Pretest**

The Vocabulary Pretest was carried out as the first step of the experiment program to make sure all the TWs unknown to the participants and to find out other unknown words for each student. It was composed of 57 words picking from the reading text according to the online program "Vocabulary profiler" (see Section 2.2.3 in Chapter 2). Comparatively speaking, they were less likely familiarized by the participants among the running words of the text.

**2) Four vocabulary posttests**

In this study, four vocabulary tests were applied to test the participants' vocabulary gain and retention. "Vocabulary gain" refers to the fact that a new word is learned, especially immediately after lookup. "Vocabulary retention" refers to the fact that a learner can remember the words learned after a longer time, i.e., after a month in this study. Twelve target words were chosen to operationalize vocabulary gain and retention.

Learner's vocabulary gains of vocabulary knowledge were measured by two vocabulary tests immediately after subjects completing the comprehension questions. They were Vocabulary Gain Productive Test (shortened as VRPT, see Appendix 6), and Vocabulary Gain Receptive Test (shortened as VGRT, see Appendix 7).

This was a common practice in studies of vocabulary learning to examine the effects of time on vocabulary gain. Learner's vocabulary retentions were measured by the same two vocabulary tests but delayed after one month. They were Vocabulary Retention Productive Test (shortened as VRPT, see Appendix 8) and Vocabulary Retention Receptive Test (shortened as

VRRT, see Appendix 9). These tests were carried out on paper. Both the immediate tests and delayed tests were carried out in the same order as listed above to avoid learning effects.

The productive test was only for target words on which students were made to elaborate by the two while-reading enhancement tasks. For other unknown words besides TWs in the Vocabulary Pretest, it was unlikely that learner might learn their spelling form after the treatment. Therefore, no productive test was designed for those words. The receptive test was the same as the Vocabulary Pretest.

### 3.5.2 LUB file for learners' lookup behavior

How an e-dictionary was used was demonstrated by the participants' lookup behavior recorded by the LUB file in the instruction program. Which words were looked up and how many times they were looked up were traced and recorded in the file by the unobtrusive recording function of the program.

The vocabulary instruction program was equipped with the function of recording learners' look-up behaviors in a file, called the LUB file for convenience. The LUB file of the program operationalized the function of unobtrusive observation as a research tool. The unobtrusive research instrument was realized by the combination of electronic dictionary and other computer technology. To language researchers, the specialty of computer technology made it possible to unobtrusively trace and record learner's dictionary lookup behavior in the data collection stage. It created a perfect nature-like research environment for vocabulary researchers to observe and analyze the language phenomenon without bringing any interference influence. It was a good way to decrease the research effect i.e., Hawthorn Effect to the lowest point without the observation of LUB being noticed by learners. Parsons (1974) discusses the Hawthorne effect which, in experimental research, is the unwanted effect of the experimental operations themselves.

### 3.5.3 Questionnaires

Two questionnaires were used in order to investigate the participants' opinions towards the vocabulary instruction program and their vocabulary learning behaviors after treatment in the experimental group. Questionnaire One (see Appendix 10), consisted of two parts. The first part dealt with the participants' personal information and the second part were the questionnaire items, which took the format of five Likert Scales, ranging from "strongly disagree", "disagree", "slightly disagree", "agree" to "strongly agree".

In order to investigate the participants' reaction to the EBEVOL Model, i.e., the program, three open-ended questions were asked from different angles in Questionnaire Two (see Appendix 11). The participants were asked to give their opinions for these questions: if the program helped them learn new words and what the reasons were; what the strengths and weaknesses of the program were and what the reasons were; if they liked the program as a tool for learning vocabulary and what the reasons were.

Due to the fact that the participants should not be forewarned of the upcoming vocabulary tests, it was not good to carry out a pilot study with them. Otherwise, the students would pay more attention to new words for the sake of the vocabulary tests therefore an extraneous variable would be brought into the experiment. However, in order to test the validity and reliability of the vocabulary tests and the questionnaires, 38 English-major freshmen were given the treatment before the main study (see Section 3.9 in this chapter).

## 3.6 Procedures

This vocabulary instruction was accomplished by the computer program in Phase One, which was carried out within 2 hours in-class time. It was followed by the two delayed vocabulary tests for all of the participants after a month in Phase Two. The whole procedure of

this study is shown by Figure 3.1.

In order to contrast the effects of the EBEVOL Model, a control group was used. For them, the e-dictionary was not available and some tests were not administrated. Therefore, there are two versions of the experiment program. Another version of the program was designed for the control group by modifying the vocabulary instruction program for the experimental group, e.g., deleting some functions and some parts.

**Step 1: Give a vocabulary pretest**

The Vocabulary Pretest came first in the program before the reading activity for two purposes:

1. To check if the twelve target words were unknown to all of the participants;

2. To investigate what other words were unknown to each of the participant.

The Vocabulary Pretest was adapted from the Word Test. According to the result of the Vocabulary Pretest, any participant who knew any of the target word could be excluded from further analysis. Meanwhile, it could mark the starting points of the participants' word learning activity.

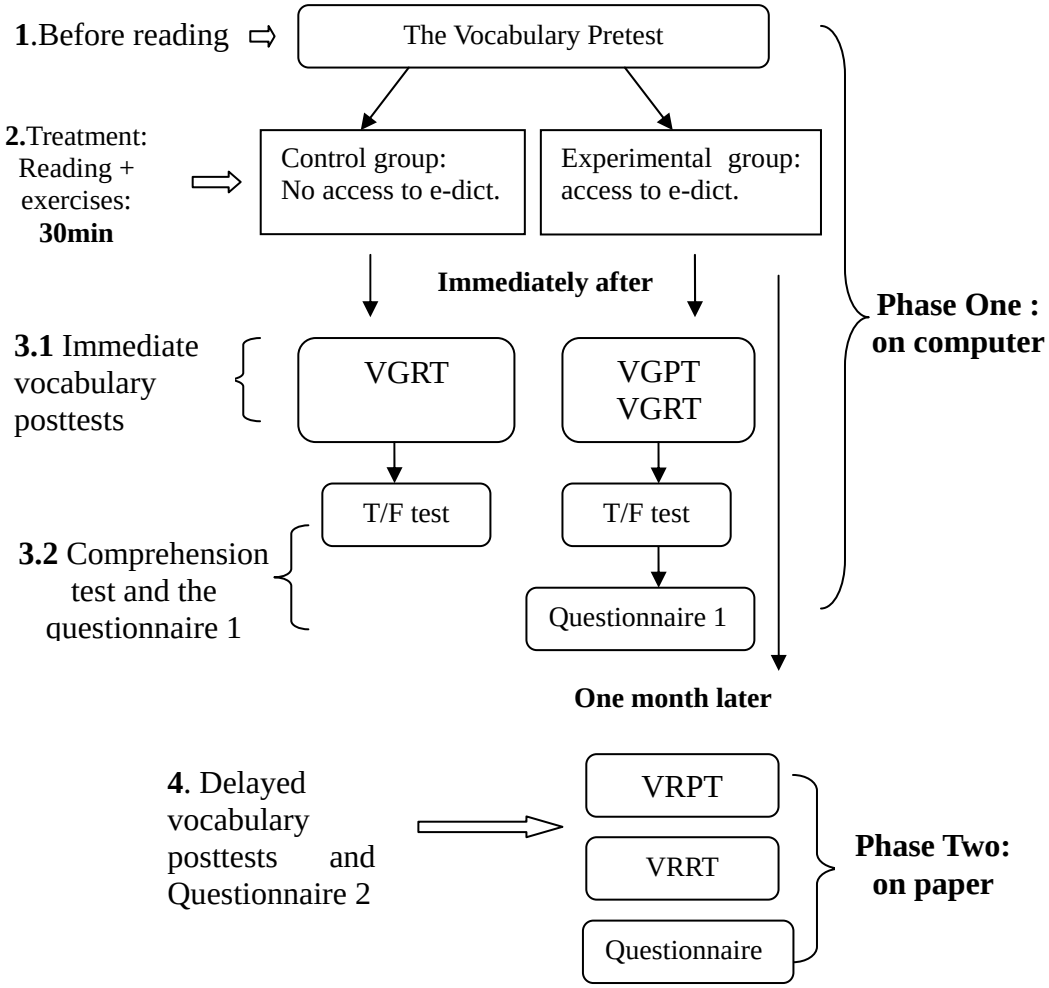



**Figure 3.1 Procedures of the main study**

Notes: VGPT= Vocabulary Gain Productive Test; VGRT= Vocabulary Gain Receptive Test; VRRT= Vocabulary Retention Receptive Test; VRPT= Vocabulary Retention Productive Test.

**Step 2: Forewarn the T/F comprehension test, read the article and complete two while-reading enhancers**

First, a true or false RC test was announced beforehand to make the participants focus on the information the text conveyed and pay attention to unknown words obstacling their understanding of the text. The T/F comprehension test was a post-reading test. The reading purpose operationalised by the T/F comprehension test was to make readers focus on the

information the text conveyed, and read the text carefully so that they attended to relevant unknown words by guessing or by looking them up in the dictionary. Equipped with the e-dictionary, the experimental group could look up these words. However, the control group could only guess their meaning by themselves without any dictionary available. Next, both groups were required to complete the two tasks, while-reading word relevance and the matching task, while reading the text. The two tasks were designed to help learners learn all of the twelve target words. Both while-reading word relevance and the matching task were to make students in the experimental group “notice” these target words and look them up in the embedded dictionaries, and elaborately process them. For the control group, the two tasks were only to make them guess the meaning of the words.

The students in the experimental group were told that they could lookup any word they did not know in this stage. The participants were not allowed to write any word down during the whole program to prevent them from looking up the words later. They were not be forewarned of the vocabulary tests afterwards i.e., a month later to avoid they would pay too much attention to these words.

**Step 3: Provided immediate unwarned vocabulary posttests, the T/F comprehension test and Questionnaire One**

When completing the reading of the text and answering questions for the two while-reading tasks, the subjects in the experimental group were given two vocabulary posttests, i.e., VGPT and VGRT, immediately after reading and looking up to test their mastering of the form and the meaning of the target words. The students in the control group were given only one vocabulary test to test how well they mastered the meaning of the target words, i.e., VGRT.

In the program, the two vocabulary posttests for experimental group were administrated in certain order to prevent the learning effects. The productive test came before the receptive

test because the retrieval of the productive knowledge was more challenging than that of the receptive knowledge.

After the vocabulary posttests, the true or false comprehension test was administrated to check readers' understanding of the text. There were 30 questions.

For the experimental group, they were required to answer Questionnaire One contained in the program at the end.

Step One to Step Three were carried out on computer by the vocabulary instruction program.

**Step 4: Provide delayed unwarned vocabulary tests and Questionnaire Two**

The same two vocabulary posttests with different names, VRPT and VRRT were given to the participants in the experimental group again in the same order a month later. For the sake of convenience, the tests and Questionnaire Two were not administrated on computer, but instead, on paper.

## 3.7 Data collection and scoring

The data in this study included two parts collected in two phases. Data of the first phase referred to the data gathered by the program including two files for each participant in the experimental group and one file for those in the control group. Data of the second phase referred to those gathered from the on-paper vocabulary posttests, i.e., VRPT and VRRT and Questionnaire Two one month later.

For the experimental group, the participants' answers to the Vocabulary Pretest, the two immediate vocabulary posttest and Questionnaire One were collected and saved as a file by the program automatically. All the words that the subjects looked up, the lookup frequency for every word and participants' answers to the questionnaire were saved by the program in the LUB file to be analyzed in next stage.

For the control group, without any lookup behavior, all of the data related were their answers to the corresponding questions, which were saved in one file in the program.

The data from the two delayed vocabulary tests were gathered on paper. It did not make much difference for obtaining data from computer or from paper, but this saved trouble from searching for language lab facility which was always occupied.

The five vocabulary tests, the Vocabulary Pretest, VGPT, VGRT, VRPT and VRRT were all subjective tests. A manual grading way was adopted to score these tests by two independent raters, the researcher and another experienced teacher of English. The provision of the correct meaning for a target word or the correct spelling form of a target word gained one point for a participant. If failed in offering a correct answer, zero was given to him / her. Some answer between right and wrong was given “0.5” point. The inter-rater reliability was counted (see Section 3.9.6 in Chapter 3).

## 3.8 Data analysis

This part deals with the methods used for data analysis in order to answer the research questions.

After the data collected from the vocabulary instruction program, the delayed tests and Questionnaire Two, the research questions were analyzed quantitatively by using SPSS and analyzed qualitatively.

The statistical analysis methods were described according to the research questions (see Table 3.3).

**Table 3.3 The methods of data analysis according to the research questions**

| | Research questions | Data analysis |
|---|---|---|
| 1. | Is there a significant difference in target word learning between the control group and the experimental group? | Independent samples t-test |
| 2 | To what extent does the EBEVOL Model help learners learn target words receptively and productively? | Descriptive statistics |
| 3 | Do learners in experimental group learn more unknown words besides the target words than those in control group do? If so, to what extent? | Descriptive statistics; Independent samples t-test |
| 4 | Is there a correlation between learners' lookup frequency and their vocabulary scores? | Bivariate correlation |
| 5 | What are the reasons for the preferences of this vocabulary instruction program? | Descriptive statistics; Qualitative analysis |

Raw data from the participants in the experimental group were inputted into the SPSS to be analyzed, such as their lookup frequency of each unknown words (including the target words), their scores for each of target words or each of the other unknown words on the four vocabulary tests, and the students' choices for the questionnaire items, etc. The control group had no data concerning lookup behavior, productive tests and questionnaires.

To answer Research Question One, the vocabulary learning/acquisition of learners who read the text aided with an e-dictionary (the experimental group) was compared to that of learners who could not access the dictionary (the control group).

The independent variable for this question was dictionary access. The dependent variable was the participants' scores on the immediate receptive vocabulary posttest. Independent t-test was employed to answer this question. Independent samples t-test is used in situations in which there are two experimental conditions and different participants have been used in each condition (Field, 2005). Independent samples t-test was employed in this study to compare the difference between the two groups in their learning of the meaning of the TWs to show how the EBEVOL Model could help the experiment group learn vocabulary. The null hypothesis of this question was there was no significant difference in vocabulary acquisition

between the experimental group and the control group.

Research Question Two answered the question that to what degree the model (dictionary use under enhancement techniques) could help the students in the experimental group remember the form and meaning of the target words immediately and one month later.

Although different learners had his own list of unknown words which was different from each other, the number of words learned besides TWs could be computed for each of them by comparing their score on the VGRT with that on the Vocabulary Pretest. Therefore, the extent to which they had learned the words could be investigated. Research Question Three did this job. Answers to this question would present the effects of dictionary use on learning and acquisition of other unknown words while reading an authentic text. The experimental group and the control group were compared for the difference in learning the unknown words besides TWs by Independent Samples T-test. Implications for participants' vocabulary learning of other unknown words could be concluded.

The independent variable in Research Question Four was lookup frequency and the dependent variable was vocabulary gain and retention. The Pearson correlation coefficient between the lookup frequency and vocabulary gain and retention (the four tests) were analyzed by bivariate correlation four times in order to answer this question. However, only data related with the twelve target words were involved in answering this question. Learners' LUB frequency for other unknown words was not analyzed because each participant had a different list of other unknown words from each other.

In Research Question Five, analysis of frequency was employed to report the students' reaction to the model according to Questionnaire Two. The reasons of preference towards the vocabulary instruction program and the EBEVOL Model were explored qualitatively by the method of *content analysis* from Questionnaire Two.

## 3.9 Pilot Study

A pilot study was administrated out of the following considerations:

1. To check the validity/reliability of the instruments;

2. To try out the program in order to ensure each step goes smoothly;

3. To ensure the data collected support the EBEVOL Model;

4. To find out if any difficulties may arise.

### 3.9.1 Participants

Due to the limitation of the availability of language laboratory in other universities, English major freshmen were chosen as the participants of this pilot study in the same provincial university college as the main study does. The original number of participants in Pilot Study Two was 90. They were from two intact classes. Their ages were between 19 to 21 years old. Most of them were female. They had studies English for at least seven years.

According to their scores in the National Matriculation Examination, the participants were sequenced from high level to low level and were evenly assigned to the experimental group and the control group one by one. Before the experiment, the name lists of the experimental group and the control group were inputted by the researcher into the server of the program. The experimental group was called Group A and the control group Group B in the program.

However, due to a sudden blackout at the end of the experiment in the language labs, only 42 participants' answers were submitting successfully to the server with 23 in the experimental group and 19 in the control group. Four students were excluded from the study out of the following reasons. One student got jumped out of the program halfway due to an

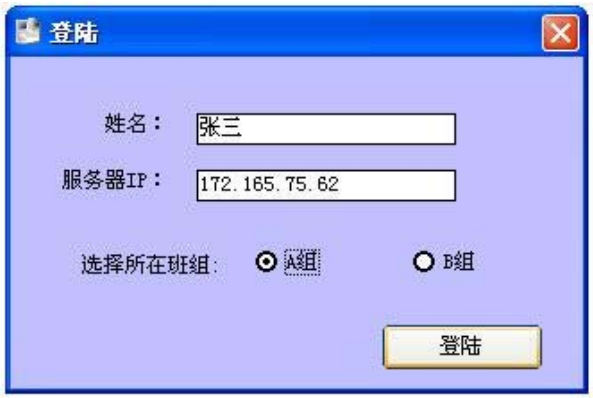
unknown mistake in the program and her answers to the Vocabulary Pretests again were invalid since she wrote the meaning of most of the target words in the Vocabulary Pretest. Another student knew one of the target word “dangle” and the rest two students knew the meanings of two target words “stubby” and “nick”. Finally, the data of 19 students in the experimental group and 19 students in the control group were used for analysis.

### 3.9.2 Administration of the program

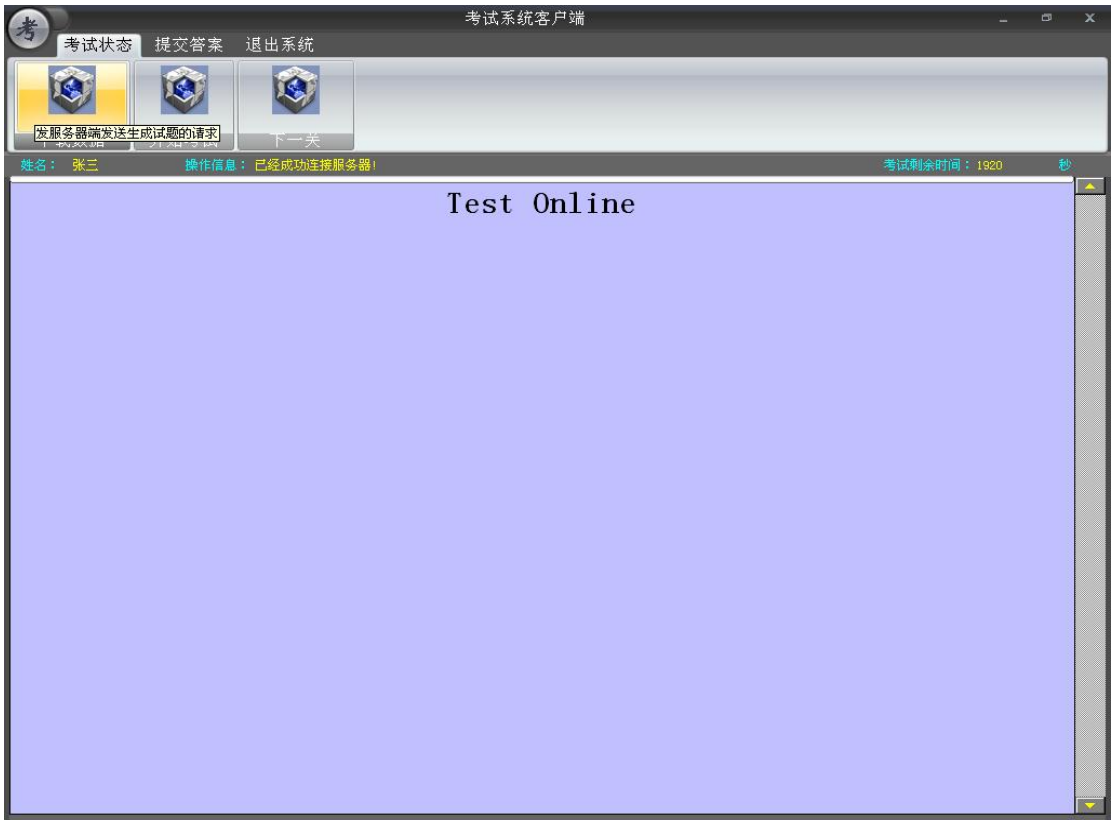
Before the administration of the experiment, the computers in the two language labs were checked carefully if they were in good condition. The students’ computers were checked if they could connect to the teacher’s computer in each lab and if the Chinese Input Method was installed. The IP address of each lab was found out for future use. The program was installed in the two labs with the server in teacher’s computer and the client in students’ computers.

The experiment was carried out during regular class time in March of the year 2010. The participants were told that they were invited to take a reading comprehension test for a Ph. D. study. They were required to finish the test, which includes six parts for those in Group A (the experimental group) and five parts for those in Group B (the control group) within two in-class hours. They were told to read the directions of each part carefully because the requirements of this test were different from other regular tests.

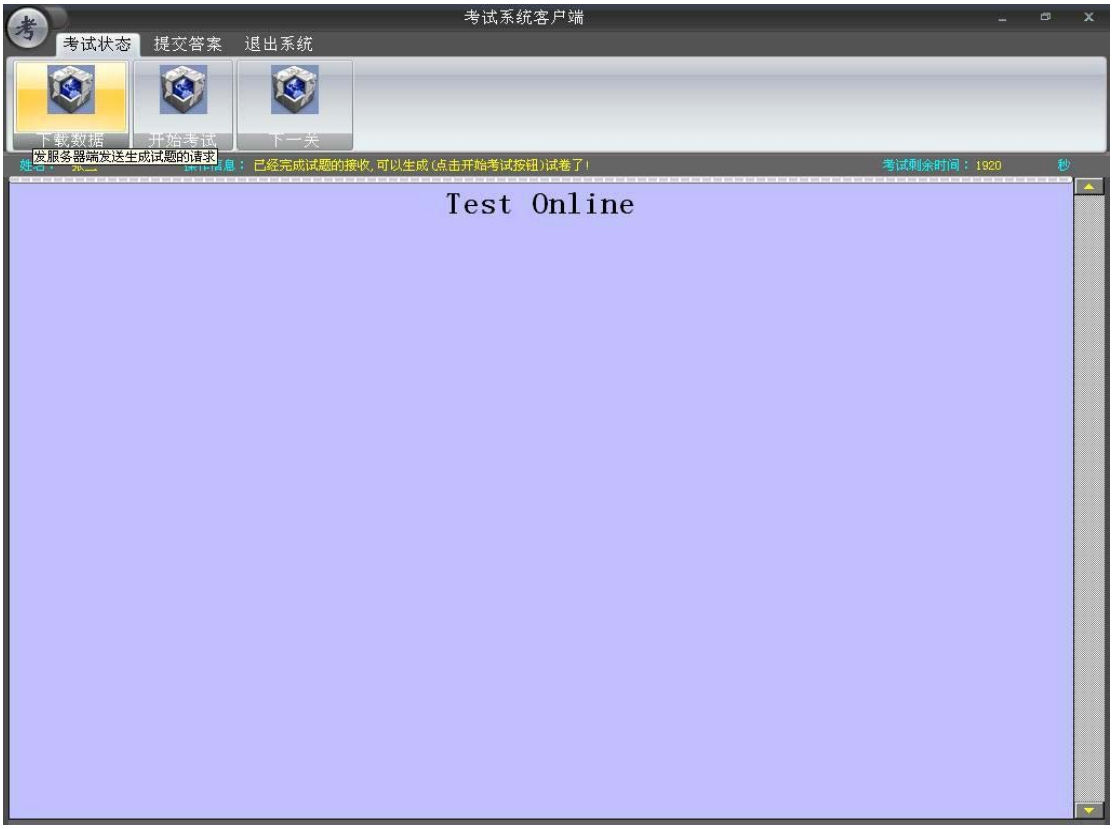
Every participant was assigned a computer. They logged in the program by their name, the IP address of the server and the group number told by the researcher and another teacher who assisted the study. Only with the correct characters of their name, the right IP address and the right group number could they log in the program successfully.

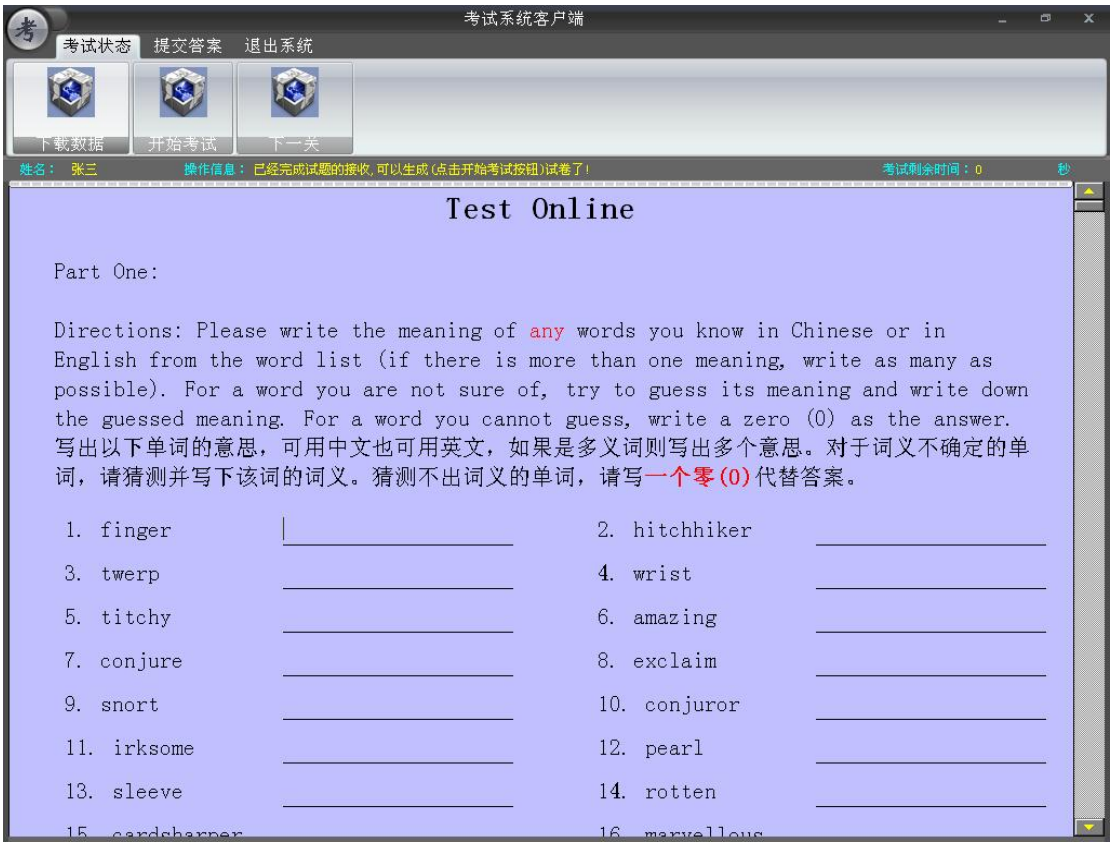



The participant got connected to the server after they boarded in the program. Then they clicked the first of the three buttons with a cube to ask for the test material in the server.




After they sent the requirement, the test material was assigned to the clients' computers and they clicked the second button to begin the test.



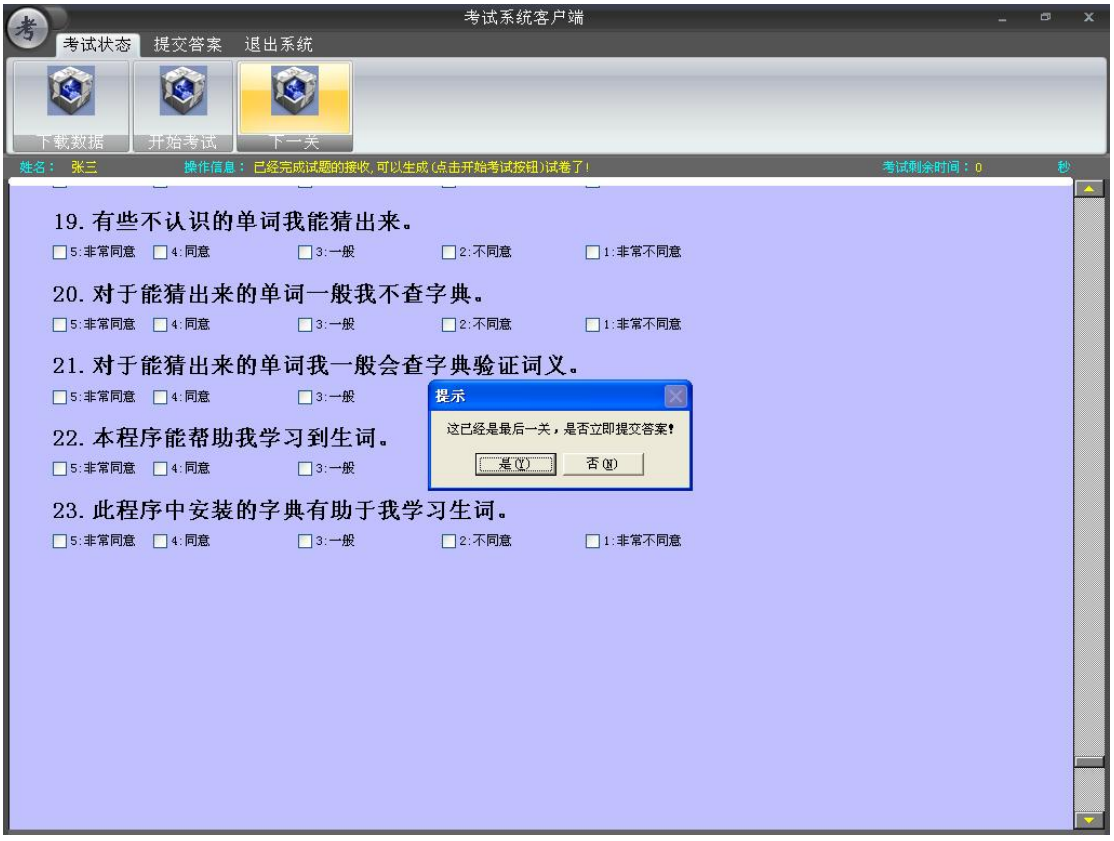




The third button was for the participants to go to next part. The program was equipped

with the function that the learner could not proceed to next part when they failed in inputting the answers for all of the questions in the part he or she was answering in order to ensure all of the data needed be collected. They might write a zero or 0 for any word whose meaning was unknown to them.

The program was designed with the function that it was impossible for learners to quit the program or use other programs outside the program in the computer once the test began for an uninterrupted test.

When the participants finished all of the questions in the program, they were reminded to submit their answers by which the answers would be sent to the server.




A password was needed for quitting from the program in the Goodbye page of the grogram. This was to prevent any learners who was good at computer to go and find the files saving his or her answers and modify them.


### 3.9.3 Data collection and data analysis

When a participant finished the last part of the tests in his or her group and submitted his or her answers, the data were sent to the server and saved in two files to be collected by the researcher afterwards. The data gathered includes the participant's answers to the questions and the record of their lookup behavior. Due to the sudden blackout near the end of the experiment, some data were lost and the related participants were deleted from data analysis.

One month later, the same two vocabulary posttests and Questionnaire Two were given to those students in the experiment group who succeeded in sending their answers to the server. Their answers were gathered on paper.

The data from thirty-eight students, 19 in the experimental group and 19 in the control group, were analyzed.

The participants' answers to the five vocabulary tests, two while-reading tasks and the T/F comprehension test were graded by the researcher and an experienced English teacher, who

was a colleague of the researcher. The raters graded the answers independently firstly and then double-checked each other's work to find out any disagreement. The disagreements were discussed carefully for unanimous agreements. Out of the total 248 answers for each participant, there were quite few disagreements. The inter-rater reliability was higher than 95%.

The participants' lookup behavior observed by the program were sorted by the researcher according to the order in the Vocabulary Pretest and inputted into the SPSS program to be analyzed further.

The answers of the participants in the experimental group to the open-ended questionnaire were analyzed by applying the method of "content analysis" in order to conclude the reasons for the learners' preferences of the program.

### 3.9.4 Results of the pilot study

Quantitative and qualitative methods were adopted in data analysis in the pilot study.

All of the participants' scores, their LUB frequency, and their choices in Questionnaire One were inputted in the SPSS program and analyzed quantitatively according to the research questions.

#### 1) Descriptive statistics

Descriptive statistics of the participants scores in the tests and exercises provide an opportunity for us to know the general effects of the program as Table 3.4 and Table 3. 5 show.

As Table 3.4 shows, the mean score of the experimental group in the Vocabulary Pretest is 13.553, much lower than that of the control group, which is 17. The participants in the experimental group knew less words, near four words in average less than the control group did before the treatment. The highest and lowest score of the experimental group are 25 and 2 while those of the control group are 10.5 and 26.5. In a word, the students in the experimental group performed worse than the control group did in the Vocabulary Pretest.

**Table 3.4 Descriptive Statistics of the vocabulary tests**

| Tests | Group | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|---|
| Pretest (57 words) | 1 | 19 | 2 | 25 | 13.553 | 5.2172 |
| | 2 | 19 | 10.5 | 26.5 | 17.000 | 4.2882 |
| VGPT (12 TWs) | 1 | 19 | 1 | 11 | 5.947 | 2.5489 |
| VRPT (12 TWs) | 1 | 19 | 1 | 8 | 3.632 | 2.1398 |
| VGRT (12 TWs) | 1 | 19 | 4 | 12 | 8.3421 | 2.42700 |
| | 2 | 19 | 1 | 9 | 3.8947 | 2.02470 |
| VRRT (12 TWs) | 1 | 19 | 1 | 9.5 | 4.1842 | 2.76993 |
| VGRT-Pretest (other unknown words) | 1 | 19 | 3.5 | 27.5 | 13.6316 | 6.54438 |
| | 2 | 19 | 0 | 8.5 | 3.1053 | 2.71098 |
| VRRT-Pretest (other unknown words) | 1 | 19 | 0 | 24.5 | 8.2368 | 7.34538 |

Note: Group 1= experimental group; Group 2= control group

The experimental group learned the spelling form of 5.947 target words (49.6% of the twelve TWs) and the meaning of 8.3421 TWs (69.5%) immediately after the treatment and they could spell 3.632 TWs (30.3%) and the meaning of 4.1842 TWs (34.9%) a month later. For students in the control group, they learned the meaning of 3.8947 TWs in the program.

The students in the experimental group got to know the meaning of 13.4737 new words besides the TWs while the control group learned the meaning of only 3.1053 new words besides the TWs in the program. There are 8.0789 words remained in the mind of the participants in the experiment group after one month.

For the task of while-reading word relevance (see Table 3.5), the mean of the experimental group is eight and that of the control group is 8.5. The two surprising numbers might be out of the different requirements of the two groups for this task due to the design need of the study. Learners in the experimental group were required to answer the questions in Chinese in order to make them look up the Chinese meaning of the relevant target words. However, out of the consideration that the learners in the control group might not be able to make out the Chinese meaning of the relevant target words, English answers were acceptable. One point was given to a correct English answer with wrong guess of its Chinese meaning or no Chinese meaning. However, for those in the experimental group, a correct answer in English was only given "0.5" points. Therefore, the control group obtained not low mean score for this task. Learners' achievements in this task were not compared between the experimental group and the control group because of the different grading standards.

**Table 3.5 Descriptive Statistics in while-reading tasks and the T/F comprehension test**

| | Group | N | Mean | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| While-reading word relevance | 1 | 19 | 8. | 2.1985 | .5044 |
| | 2 | 19 | 8.5 | 1.9930 | .4572 |
| The matching task | 1 | 19 | 10.053 | 1.3112 | .3008 |
| | 2 | 19 | 4.263 | 2.1303 | .4887 |
| T/F comprehension test | 1 | 19 | 22.342 | 3.3336 | .7648 |
| | 2 | 19 | 21.342 | 4.0622 | .9319 |

Note: Group 1= experimental group; Group 2= control group

The e-dictionary should have helped the participants in the experimental group a lot, they got a much better score (mean=10.053) than the control group did (mean= 4.263) on the matching task.

In the T/F comprehension test, however, similar means were found between the experimental group (22.342) and the control group (21.342).

**2) Independent Samples T-test**

Independent Samples T-test was applied to analyze the differences between the experimental group and the control group in vocabulary learning and their performances in the exercises and test of the three enhancers.

A significant difference was found in the Vocabulary Pretest between the experimental group (M=13.553, see Table 3.4) and the control group (M=17) by comparing their mean, t(36) =-2.225, p=.032.

The difference in learning the meaning of the twelve target words between the experimental group (M=8.3421) and the control group (M=3.8947) was found significant, t(36)=6.133, p=.000.

**Table 3.6 Independent t-test results (N=38)**

| | t value | Df | Significance. (2-tailed) |
|---|---|---|---|
| Pretest | -2.225 | 36 | .032 |
| The matching task | 10.088 | 36 | .000 |
| T/F comprehension test | .829 | 36 | .412 |
| VGRT-Pretest (12 TWs) | 6.133 | 36 | .000 |
| VGRT-Pretest (other unknown words) | 6.477 | 36 | .000 |

Note: Significance level is at 0.05.

The numbers of words learned among the unknown words besides TWs for the learners were computed by subtracting their achievements of those non-target words in the Vocabulary Pretest from that in the immediate receptive vocabulary test. A significant difference was found between the experimental group (M=13.6316) and

the control group (M=3.1.53) in learning the meaning of the other unknown words besides the TWs, t (36) =6.477, p =.000.

For the matching task, a significant difference in learners' achievements was found between the experimental group (M=10.053, SD=1.3112) and the control group (M=4.263, SD=2.1303), t (36) = 10.088, p=.000.

However, no significant difference in learners' achievements in the T/F comprehension test was found between the experimental group (M=20.5778, SD=4.33531) and the control group (M=18.2556, SD=4.8308), t(36) = .829, p= .412. This might be because the participants in the control group could comprehend the text with a not bad vocabulary size.

Independent samples t-test was not administrated for the task of while reading word relevance because of the different directions/requirement for the two groups.

All in all, the E-dictionary-based Enhancers for Vocabulary Learning Model was proved efficient in helping learners learn the meaning of the TWs and other unknown words besides TWs.

**3) Correlation**

There was no significant correlation found between learners' lookup behavior of the twelve target words and their achievements in the four vocabulary posttests (p=.70, p=.643, p =.302, p=.476).

**Table 3.7 Correlations between LUB and vocabulary gain and retention**

| | | VGPT | VRPT | VGRT(TWs) | VRRT(TWs) |
|---|---|---|---|---|---|
| LUB (TWs) | Pearson Correlation | -.009 | .114 | .250 | .174 |
| | Sig. (2-tailed) | .970 | .643 | .302 | .476 |
| | N | 19 | 19 | 19 | 19 |

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

**4) Content analysis**

The method of *content analysis* was applied to analyze the participants' answers to the open-ended questionnaire. The three questions in the questionnaire were designed to elicit the reasons for the preference of the vocabulary instruction program. The participants' answers were coded and divided into categories. Five reasons of preference were found:

Reason 1: High efficiency promoting vocabulary learning

The majority of the participants expressed their preference to the program because it did help them memorize new words. To them, the efficiency of learning words by the program was quite high. Several students who usually hated memorization of new words even pointed out that the program succeeded in making them memorize certain new words naturally without any pain felt.

Reason 2: A challenging and stimulating method

The program was described the participants as being *new, unique, interesting* and *challenging*. They were provided by the program with a new and interesting way to learn new words. It was totally different from rote memorization, which was not fun at all. At the same time, the program was full of challenges to them. The challenges might come from the nature of retrieval in the questions of Enhance Two and Enhancer Three and the vocabulary test. Some students commented that the challenges imposed by the Vocabulary Pretest deepened their

impression of the new words, so did the mistakes in the Vocabulary Pretest.

Reason 3: Convenience of the electronic dictionary

It was for the sake of the cursor translation mode of the e-dictionary that the explanation of the word would appear with a small pop-up window at the top of the screen when learners put the cursor of the mouse on any word they want to know and click on it. The e-dictionary was so convenient that they could know the meaning of new words promptly and understand the text better as well.

Reason 4: Deeper impression from repeated drills

The deep impression of new words was made by the repeated requirements for word retrieval. Learners pointed out that repetition was a major reason to explain the high efficiency of the program for learning words. Although all of the target words appeared only once in the text, repeated drills on them were required from the vocabulary pretest to the three enhancers and even the vocabulary posttest demanded word retrieval.

Reason 5: Aid of contextual clues to word learning

The value of context for word learning was mentioned by the students that learning words in context was easier than in isolation. The context could leave vivid pictures in readers' mind for certain words which helped learners retrieve these words more easily in the later stage. A student commented that she could remember a new word if it appeared several times in a text as in the program or in several texts. To these students, this program made the learning of new words easier and at the same time, the comprehension of the text better.

### 3.9.5 Implications and improvements

Except for the sudden blackout at the end of the experiment, which caused a great loss to the data collection, the program was proved a success that the EBEVOL Model did help the learners learn the meaning of target words and the meaning of other unknown words by

comparing the experiment group and the control group in the pilot study. Somehow, the pilot study also exposed some content and technical flaws of the program.

Firstly, the content of some items of questions were improved.

Question 11 of the while-reading word relevance task did not exert its function as supposed. The question “What other belongings of his were also taken by the hitch-hiker without permission besides his driver's license, a key ring with four keys on it, some pound notes, a few coins, a letter from his publishers, his diary?” was designed to make learners pay attention to two target words, “stubby” and “sapphire”. However, some students only noticed one of the two words. Therefore, the question was modified by adding a request, “(list all)”.

The original statement of Item 5 of the T/F comprehension test, “Less than one person in a million can learn to do the hitchhiker’s job.” was difficult for learners to judge since a large number was too difficult for learners to remember and tended to make learners get confused. It was revised by a new statement “A lot of people can learn to do the hitchhiker’s job”.

Secondly, the program was improved to avoid the following technical problems.

1. One student was jumped out of the program automatically without any reason while answering the questions.

2. For Questionnaire One, the questions were not displayed in the first page that some student mistook that the program was over after they provided their information of age, major, etc.

3. The incomplete display of some item of questions in the while-reading word relevance task and the T/F questions due to the difference between the monitor of the program developer and the monitors in the language lab.

At the same time, some directions of the tests and exercises were improved by highlighting some important words into red color in order to make learners notice them immediately and pay enough attention to them.

### 3.9.6 Validity and reliability

Three measures were taken to check the validity and reliability of the instruments used in this study.

Firstly, the adapted passage, the while-reading word relevance exercises and the True or False comprehension Test were sent to two experts to check the content, especially grammar and fluency. Some judgments were made according to their suggestions.

Secondly, the instruments were tried out with the participants in the pilot study.

The two while-reading tasks aimed to lead learners' attention to the twelve target words. Their validity depended on how well the questions succeeded in doing this job. The participants' scores of the two exercises showed their validity (see Table 3.8).

The highest score of the while-reading word relevance is 11.5 for the experimental group and 12 for the control group out of the 11 questions for 12 target words. Question 11 was designed for two target words and one point was given to an answer containing the relevant information of one word. The mean score of this task is eight for the experimental group and 8.5 for the control group.

**Table 3.8 Descriptive statistics of the enhancers**

| Tests | Group | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|---|
| While-reading word relevance | 1 | 19 | 4.5 | 11.5 | 8. | 2.1985 |
| | 2 | 19 | 5 | 12 | 8.5 | 1.9930 |
| The matching task | 1 | 19 | 8 | 12 | 10.53 | 1.3112 |
| | 2 | 19 | 1 | 8 | 4.263 | 2.1303 |
| T/F comprehension test | 1 | 19 | 15.5 | 26.5 | 22.342 | 3.3336 |
| | 2 | 19 | 10.5 | 25.5 | 21.342 | 4.0622 |

The highest score of the matching task is 12, the full score for this task and the lowest score eight for the experimental group. The mean of this task is 10.53 for the experimental group. However, for the control group, the highest score is eight, the lowest score 1 and the mean is 4.263.

The effects of the T/F comprehension test lied in its forewarned function. It fulfilled its job when learners were made to notice new words in the text and learned them with the help of the e-dictionary out of the purpose to comprehend the text. Its validity was proved firstly by the significant difference in learning new words between the experimental group and the control group and secondly the number of their correct answers to the T/F comprehension test.

Lastly, the reliability of the Vocabulary Pretest, the T/F comprehension test and Questionnaire 1 were checked by Cronbach's Alpha Coefficiency by SPSS. The reliability coefficient of the Vocabulary Pretest was .7839. The alpha of the T/F comprehension test was .6691. The reliability coefficient of Questionnaire One was .7904. All were above the distinguishing point, .65.

## 3.10 Experimental phases

The experiment program, i.e., Phase One of the main study, was administrated after the program was modified accordingly in April in the year of 2010. The whole procedure and the content of the program were demonstrated in full length in Appendix 12. Two versions of the program were shown in detail with one for the experimental group and the other for the control group. One hundred graduate first-year students participated in the experiment in two language labs during regular class time of two hours at a provincial university in Guizhou Province of China (see

Section 3.3 in this chapter). After one month, Phase Two of the study was carried out for the delayed vocabulary posttests and Questionnaire Two on the experimental group.

Same as in the pilot study, the data collection in the main study were in two phases, firstly by the program and then on paper. Similar methods of data analysis as the pilot study were adopted (see Section 3. 9.3 in this chapter).

## 3.11 Summary

The methodology of this study is introduced in detail in this chapter from research design, variables, participants, materials, instruments, procedure, data collection and data analysis. The whole pilot study and a brief description of the experimental phases are presented, too.

# CHAPTER 4

# RESULTS

This chapter presents the findings of the study. Results of data analyses are reported both quantitatively and qualitatively. This chapter begins with the subjects' performances in the Vocabulary Pretest and then is organized in the order of answering the five research questions, which were proposed in Chapter One.

## 4.1 Results of the Vocabulary Pretest

The results of the Vocabulary Pretest demonstrated two main points:

1) The twelve target words were proper for this study;
2) There was no significant difference in the participants' scores on the Vocabulary Pretest between the experimental group and the control group.

### 4.1.1 Properness of target words

The Vocabulary Pretest in this study was not a real "pretest" for the target words since its purpose was to determine that no subjects in this study know any of the twelve words. Therefore, the experiment was carried out to investigate the effects of EBEVOL Model on helping learners (the experiment group) learn these words or a new meaning of some word. All of the data (including the Vocabulary Pretest) were gathered first from the "client" part of the program on the students' computer and then sent

automatically to the server on the teacher's computer on the day the experiment was administrated. For the Vocabulary Pretest, a student who did not write out any meaning sense of a word was given "0" point. On the contrary, one point was given when the student succeeded in offering the/a correct meaning of the word. At the same time, "0.5" was given to an answer not very accurate. Ten subjects who knew some target word were excluded from data analysis. Among them, seven students knew the word "dangle"; one knew "snort"; one knew "nick"; and one knew "stubby". The results of the Vocabulary Pretest are described as Table 4.1.

**Table 4.1 Pretest scores of all the subjects (N=90)**

| Words | 0 point | | 0.5 point | | 1 point | |
|---|---|---|---|---|---|---|
| | frequency | percentage | frequency | percentage | frequency | Percentage |
| 1. finger | 5 | 5.6 | 0 | 0 | 85 | 94.4 |
| 2. hitchhiker | 67 | 74.4 | 4 | 4.4 | 19 | 21.1 |
| **3. twerp** | **90** | **100** | **0** | **0** | **0** | **0** |
| 4. wrist | 61 | 67.8 | 0 | 0 | 29 | 32.2 |
| **5. titchy** | **90** | **100** | **0** | **0** | **0** | **0** |
| 6. amazing | 30 | 33.3 | 12 | 13.3 | 48 | 53.3 |
| 7. conjure | 81 | 90 | 9 | 10 | 0 | 0 |
| 8. exclaim | 31 | 34.4 | 1 | 1.1 | 58 | 64.4 |
| **9. snort** | **90** | **100** | **0** | **0** | **0** | **0** |
| 10. conjuror | 82 | 91.1 | 8 | 8.9 | 0 | 0 |
| **11. irksome** | **90** | **100** | **0** | **0** | **0** | **0** |
| 12. pearl | 53 | 58.9 | 0 | 0 | 37 | 41.1 |
| 13. sleeve | 64 | 71.1 | 0 | 0 | 26 | 28.9 |
| 14. rotten | 61 | 67.8 | 0 | 0 | 29 | 32.2 |
| **15. cardsharper** | **90** | **100** | **0** | **0** | **0** | **0** |
| 16. marvelous | 62 | 68.9 | 6 | 6.7 | 22 | 24.4 |
| 17. pal | 71 | 78.9 | 0 | 0 | 19 | 21.1 |
| **18. racket** | **79** | **87.8** | **0** | **0** | **11** | **12.2** |
| 19. leather | 44 | 48.9 | 0 | 0 | 46 | 51.1 |
| 20. license | 20 | 22.2 | 0 | 0 | 70 | 77.8 |
| 21. belt | 25 | 27.8 | 0 | 0 | 65 | 72.2 |

| Words | 0 point | | 0.5 point | | 1 point | |
|---|---|---|---|---|---|---|
| | frequency | percentage | frequency | percentage | frequency | Percentage |
| 22. brass | 71 | 78.9 | 2 | 2.2 | 17 | 18.9 |
| 23. buckle | 83 | 92.2 | 0 | 0 | 7 | 7.8 |
| 24. impressed | 27 | 30 | 11 | 12.2 | 52 | 57.8 |
| 25. unusual | 10 | 11.1 | 1 | 1.1 | 79 | 87.8 |
| 26. grin | 64 | 71.1 | 9 | 10 | 17 | 18.9 |
| 27. gently | 26 | 28.9 | 5 | 5.6 | 59 | 65.6 |
| 28. miserable | 58 | 64.4 | 4 | 4.4 | 28 | 31.1 |
| **29. flabbergasted** | **90** | **100** | **0** | **0** | **0** | **0** |
| 30. nod | 27 | 30 | 1 | 1.1 | 62 | 68.9 |
| 31. slide | 36 | 40 | 3 | 3.3 | 51 | 56.7 |
| 32. superior | 27 | 30 | 10 | 11.1 | 53 | 58.9 |
| 33. loop | 65 | 72.2 | 0 | 0 | 25 | 27.8 |
| 34. triumphant | 58 | 64.4 | 21 | 23.3 | 11 | 12.2 |
| 35. shoelace | 52 | 57.8 | 0 | 0 | 38 | 42.2 |
| **36. sapphire** | **90** | **100** | **0** | **0** | **0** | **0** |
| **37. dangle** | **90** | **100** | **0** | **0** | **0** | **0** |
| 38. undo | 63 | 70 | 6 | 6.7 | 21 | 23.3 |
| 39. glance | 23 | 25.6 | 3 | 3.3 | 64 | 71.1 |
| 40. ring | 8 | 8.9 | 82 | 91.1 | 0 | 0 |
| 41. grief | 59 | 65.6 | 13 | 14.4 | 18 | 20 |
| 42. fantastic | 35 | 38.9 | 4 | 4.4 | 51 | 56.7 |
| **43. stubby** | **90** | **100** | **0** | **0** | **0** | **0** |
| 44. stuff | 65 | 72.2 | 0 | 0 | 25 | 27.8 |
| 45. hitch | 82 | 91.1 | 1 | 1.1 | 7 | 7.8 |
| 46. lap | 76 | 84.4 | 0 | 0 | 14 | 15.6 |
| 47. palm | 53 | 58.9 | 5 | 5.6 | 32 | 35.6 |
| 48. absolutely | 17 | 18.9 | 0 | 0 | 73 | 81.1 |
| 49. lighter | 73 | 81.1 | 2 | 2.2 | 15 | 16.7 |
| 50. suck | 46 | 51.1 | 0 | 0 | 44 | 48.9 |
| 51. tray | 70 | 77.8 | 0 | 0 | 20 | 22.2 |
| **52. huffily** | **90** | **100** | **0** | **0** | **0** | **0** |
| **53. nick** | **90** | **100** | **0** | **0** | **0** | **0** |
| 54. reign | 60 | 66.7 | 2 | 2.2 | 27 | 30 |
| 55. jeweller | 35 | 38.9 | 42 | 46.7 | 13 | 14.4 |
| 56. windshield | 71 | 78.9 | 8 | 8.9 | 11 | 12.2 |
| 57. ratty | 84 | 93.3 | 2 | 2.2 | 4 | 4.4 |

The twelve target words in the table are in boldfaced form. Table 4.1 shows that none of the ninety subjects knew the eleven target words except for the word “racket”. Three students knew one of the meaning senses of “racket”. One knew that it was “a device consisting of an oval frame with a tight interlaced network of strings and a handle, used to strike a ball or shuttlecock in various games”. Two subjects knew that it means “a loud, distressing noise”. The three students were still kept for data analysis due to the fact that none of them knew the meaning “a dishonest business or practice, especially one that obtains money through fraud or extortion”, which was the target meaning of this word in this study.

In a word, the Vocabulary Pretest demonstrated that all of the twelve target words were proper to be chosen as target words in this study.

### 4.1.2 No significant difference in the performance between the two groups

Table 4.2 shows the performance of the experimental group and the control group in the Vocabulary Pretest. The mean score of the experimental group was 19.4, and the mean score of the control group, 18.733.

**Table 4.2 Descriptive statistics of the two groups in the Vocabulary Pretest**

| | Group | N | Mean | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| pretest | 1 | 45 | 19.400 | 7.8136 | 1.1648 |
| | 2 | 45 | 18.733 | 6.4997 | .9689 |

Note: Group 1= experimental group; Group 2= control group

Table 4.3 demonstrates that there was no significant difference found between the experimental group (M=19.4, SD=7.8136) and the control group (M=18.733, SD=6.4997); t(88)= 0.440, p = .661.

**Table 4.3 Independent t-test results of the difference in the Vocabulary Pretest**

| | t value | Df | Significance. (2-tailed) |
|---|---|---|---|
| pretest | 0.440 | 88 | .661 |

## 4.2 Answer to Research Question 1

**Research Question 1: "Is there a significant difference in target word learning between the control group and the experimental group?"**

This question examined the vocabulary learning/acquisition of learners reading the text with the aid from an e-dictionary (the experimental group) in contrast to that of learners who could not access the dictionary (the control group). To answer this question, an independent-samples t-test was conducted with dictionary access as the independent variable and the participants' scores on the immediate receptive vocabulary posttest, i.e., VGRT, as the dependent variable. A frequency description of their scores in the immediate receptive posttest, i.e., VGRT and a crosstabulation of the VGRT for target words between the experimental group and the control group were provided beforehand in order to show how well the students learned the target words with/without the help of e-dictionary access.

### 4.2.1 Frequency description (target words only)

Different from the Vocabulary Pretest, "0" was given to a student who failed to write out the right meaning (according to the passage "Hitchhiker") of the target words. To illustrate one example, zero point was given to the student who explained "racket" as "a loud, distressing noise or a device consisting of an oval frame with a tight interlaced network of strings and a handle, used to strike a ball or shuttlecock in

various games". This was because he/she did not learn the target meaning from the program i.e., "a dishonest business or practice, especially one that obtains money through fraud or extortion". At the same time, "0.5" point was also given to an answer not very accurate, but close to or related to the meaning to be learned.

Table 4.4 and Table 4.5 give an overall description to learners' performance in learning target words in the VGRT from the following two perspectives: 1) frequency descriptions of the scores for each of the target words and the twelve words together according to the two groups by administering crosstabs; and 2) the mean and standard deviation of each target word from the independent samples t-test.

**Table 4.4 Frequency description of scores in the VGRT (target words only) * group crosstabulation**

| Target words | Group | N | 0 point | 0.5 point | 1 point | Mean | Std. Deviation |
|---|---|---|---|---|---|---|---|
| twerp | 1 | 45 | 12 | 0 | 33 | .733 | .4472 |
| | 2 | 45 | 22 | 0 | 23 | .511 | .5055 |
| titchy | 1 | 45 | 11 | 1 | 33 | .744 | .4346 |
| | 2 | 45 | 33 | 0 | 12 | .267 | .4472 |
| snort | 1 | 45 | 13 | 0 | 32 | .711 | .4584 |
| | 2 | 45 | 31 | 0 | 14 | .311 | .4682 |
| irksome | 1 | 45 | 20 | 1 | 24 | .544 | .4980 |
| | 2 | 45 | 29 | 2 | 14 | .333 | .4647 |
| cardsharper | 1 | 45 | 6 | 7 | 32 | .789 | .3613 |
| | 2 | 45 | 11 | 18 | 16 | .556 | .3876 |
| racket | 1 | 45 | 33 | 0 | 12 | .267 | .4472 |
| | 2 | 45 | 45 | 0 | 0 | .000 | .0000 |
| flabbergasted | 1 | 45 | 29 | 0 | 16 | .356 | .4841 |
| | 2 | 45 | 32 | 0 | 13 | .289 | .4584 |
| sapphire | 1 | 45 | 20 | 0 | 25 | .556 | .5025 |
| | 2 | 45 | 34 | 0 | 11 | .244 | .4346 |
| dangle | 1 | 45 | 12 | 0 | 33 | .733 | .4472 |
| | 2 | 45 | 28 | 0 | 17 | .378 | .4903 |
| stubby | 1 | 45 | 24 | 0 | 21 | .467 | .5045 |
| | 2 | 45 | 38 | 0 | 7 | .156 | .3665 |
| huffily | 1 | 45 | 22 | 1 | 22 | .522 | .4995 |
| | 2 | 45 | 32 | 1 | 12 | .278 | .4466 |
| nick | 1 | 45 | 22 | | 23 | .500 | .0745 |
| | 2 | 45 | 25 | 1 | 19 | .278 | .4466 |
| VGRT (12 words) | 1 | 45 | | | | 6.9556 | 2.33263 |
| | 2 | 45 | | | | 3.7556 | 2.27542 |

Note: Group 1= experimental group; Group 2= control group

The effects of the EBEVOL Model on learning target words were demonstrated from the comparison of the relevant scores on VGRT between the experimental group and the control group (see Table 4.5). The control group gained most of the lower scores and the experimental group gained most of the higher scores.

**Table 4.5 Descriptive Statistics of the difference for target words between VGRT and the Vocabulary Pretest (N=90)**

| | Points | Group | | Total |
|---|---|---|---|---|
| | | 1 | 2 | |
| VGRT-pretest (target words) | .00 | 0 | 3 | 3 |
| | .50 | 0 | 1 | 1 |
| | 1.00 | 0 | 4 | 4 |
| | 1.50 | 1 | 0 | 1 |
| | 2.00 | 0 | 3 | 3 |
| | 2.50 | 0 | 4 | 4 |
| | 3.00 | 0 | 3 | 3 |
| | 3.50 | 2 | 7 | 9 |
| | 4.00 | 3 | 4 | 7 |
| | 4.50 | 2 | 3 | 5 |
| | 5.00 | 4 | 3 | 7 |
| | 5.50 | 2 | 1 | 3 |
| | 6.00 | 5 | 0 | 5 |
| | 6.50 | 1 | 2 | 3 |
| | 7.00 | 8 | 6 | 14 |
| | 7.50 | 1 | 0 | 1 |
| | 8.00 | 3 | 0 | 3 |
| | 8.50 | 1 | 0 | 1 |
| | 9.00 | 6 | 0 | 6 |
| | 10.00 | 3 | 1 | 4 |
| | 11.00 | 2 | 0 | 2 |
| | 12.00 | 1 | 0 | 1 |
| Total | | 45 | 45 | 90 |

Note: Group 1= experimental group; Group 2= control group

### 4.2.2 Independent t-test for immediate receptive vocabulary posttest

Independent Samples t-test was employed to answer Research Question One. Learners' scores for all of the twelve target words and for each of the target words in the immediate receptive vocabulary test were analyzed and the results are presented in Table 4.6.

Table 4.5 shows that there was a significant difference in learning the meaning of the target words between the experimental group (M=6.9556, SD=2.33263) and the control group (M=3.7556, SD=2.27542); t(88)= 4.685, p = .000. The null hypothesis for this question was rejected that there was no significant difference in learning of the meaning of the TWs between the experimental group and the control group. The results suggested that EBEVOL model did have an effect on helping learners learn the meaning of new words.

**Table 4.6 Independent t-test results of target words learning in VGRT in terms of dictionary access (N=90)**

| Target words | T value | Df | Significance. (2-tailed) |
|---|---|---|---|
| Twerp | 2.209 | 88 | .030 |
| Titchy | 5.139 | 88 | .000 |
| Snort | 4.095 | 88 | .000 |
| Irksome | 2.079 | 88 | .041 |
| cardsharper | 2.954 | 88 | .004 |
| Racket | 4 | 88 | .000 |
| flabbergasted | .671 | 88 | .504 |
| Sapphire | 3.141 | 88 | .002 |
| Dangle | 3.594 | 88 | .001 |
| Stubby | 3.347 | 88 | .001 |
| Huffily | 2.223 | 88 | .029 |
| Nick | .737 | 88 | .463 |
| VGRT | 4.685 | 88 | .000 |

Note: Significance level is at .05.

For the learning of the ten target words: twerp, titchy, snort, irksome, cardsharper, racket, sapphire, dangle, stubby, huffily, significant differences were found between learners aided with the e-dictionary and learners who could not access the dictionary. In another word, significant differences were found between the experimental group and the control group for ten out of the twelve target words.

There was a significant difference in the learning of the word “twerp”

between the experimental group (M=.733, SD=.4472) and the control group (M=.511, SD=.5055); t(88)= 2.209, p=.030.

There was a significant difference in the learning of the word “titchy” between the experimental group (M=.744, SD=.4346) and the control group (M=.267, SD=.4472); t(88)=5.139, p=.000.

There was a significant difference in the learning of the word “snort” between the experimental group (M=711, SD=.4584) and the control group (M=.311, SD=.4682); t(88)=4.095, p=.000 .

There was a significant difference in the learning of the word “irksome” between the experimental group (M=.544, SD=.4980) and the control group (M=.333, SD=.4647); t(88)=2.079, p=.041.

There was a significant difference in the learning of the word “cardsharper” between the experimental group (M=.789, SD=.3613) and the control group (M=.556, SD=.3876); t(88)=2.954, p=.004.

There was a significant difference in the learning of the word “racket” between the experimental group (M=.267, SD=.4472) and the control group (M=.0000, SD=.4472); t(88)=4, p=.000 .

There was a significant difference in the learning of the word “sapphire” between the experimental group (M=.556, SD=.5025) and the control group (M=.244, SD=.4346); t(88)=3.141, p=.002.

There was a significant difference in the learning of the word “dangle” between the experimental group (M=.733, SD=.4472) and the control group (M=.378, SD=.4903); t(88)=3.594, p=.001.

There was a significant difference in the learning of the word “stubby”

between the experimental group (M=.467, SD=.5045) and the control group (M=.156, SD=.3665); t(88)=3.347, p=.001.

There was a significant difference in the learning of the word “huffily” between the experimental group (M=.522, SD=.4995) and the control group (M=.278, SD=.4466); t(88)=2.223, p=.029.

For the other two words, “flabbergasted” and “nick”, no significant difference was found. There was not a significant difference in the learning of the word “flabbergasted” between the experimental group (M=.356, SD=.4841) and the control group (M=.289, SD=.4584); t(88)=.671, p=.504. And there was not a significant difference in the learning of the word “nick” between the experimental group (M=.500, SD=.0745) and the control group (M=.278, SD=.4466); t(88)=.737, p=.463.

## 4.3 Answer to Research Question 2:

**Research Question 2: “To what extent does the EBEVOL Model help learners learn target words receptively and productively?**

This question investigated the extent the EBEVOL model (e-dictionary use under enhancement techniques) helped the students in the experimental group learn the target words. It was answered from the mastering of the receptive aspect and the productive aspect of a target word in the immediate and the delayed tests: the immediate receptive vocabulary test (VGRT), the immediate productive vocabulary test (VGPT), the delayed receptive vocabulary test (VRRT), the delayed productive vocabulary test (VRPT) (see p. 71).

Table 4.7 shows that the subjects spelled out 4.578 target words and wrote down the Chinese meaning of 6.9111 words in average immediately after the

treatment. This implies that the EBEVOL Model helped the experimental group learn 38.15% of the written form and 57.59% of the meaning for the 12 target words in VGPT and VGRT respectively. The highest score on the VGPT was nine and the lowest score was zero. This means the best student could spell most of the target words. However, some students did fail to retrieve and spell any written form of these words. The situation was better in the VGRT. The best student learned the meaning of all the target words and the worst student learned the meaning of one word and had a vague impression of another word.

After one month, the subjects' mean score on the VRPT was 3.2. This means, the students remembered the written form of 3.2 target words, occupying 26.67% of the total in average. They retrieved the Chinese meaning of 5.1889 words, i.e., 43.24% of the total in the VRRT. The best student wrote eight target words. The highest score in the VRRT was 9.5.

**Table 4.7 Descriptive statistics of the four vocabulary tests (N=45)**

| Tests | Minimum | Maximum | Mean | Percentage | Std. Deviation |
|---|---|---|---|---|---|
| VGPT | .0 | 9.0 | 4.578 | 38.15% | 2.5158 |
| VRPT | .0 | 8.0 | 3.200 | 26.67% | 1.8040 |
| VGRT | 1.5 | 12.0 | 6.9111 | 57.59% | 2.30190 |
| VRRT | .5 | 9.5 | 5.1889 | 43.24% | 2.35558 |

Notes: VGPT= Vocabulary Gain Productive Test; VRPT= Vocabulary Retention Productive Test;

VGRT= Vocabulary Gain Receptive Test; VRRT= Vocabulary Retention Receptive Test.

All in all, the effects of the EBEVOL Model on target words learning were shown by the four tests: VGPT, VGRT, GRPT, and VRRT. The effect of time did erase some memory trace of the learners, but most of their memorization left.

## 4.4 Answer to Research Question 3

**Research Question 3: "Do learners in experimental group learn more unknown words besides the target words than those in control group do? If so, to what extent?"**

For different learners, their list of unknown words was different from each other. The number of words learned by a learner was counted by comparing the difference between his/her scores on the immediate receptive vocabulary test and the Vocabulary Pretest. Therefore, the extent to which learners learned the words might be investigated. To examine the learning of other unknown words besides TWs, data related to the TWs were excluded from the Vocabulary Pretest and the VGRT while analysis for answering Research Question 3. Therefore, more pictures was to be presented to the effects of dictionary use on learning and acquisition of other unknown words besides target words while reading an authentic text.

For each participant, the number of the learned unknown words besides the target words was computed by taking his score on the vocabulary pretest for the other unknown words from his score on the VGRT for the other unknown words. From Table 4.8, the best learner among the ninety participants got 27.5 points, which means he/she learned more than 27 words. However, there were some student learned no word, neither. In average, the students learned the meaning of 5.922 words besides the target words. For more details, see Table 4.8.

**Table 4.8 Descriptive Statistics of the difference for other unknown words between VGRT and the Vocabulary Pretest (N=90)**

| | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|
| VGRT-pretest (other unknown words) | .00 | 27.50 | 5.9222 | 6.18802 |

Table 4.9 lists the frequency statistics of the subjects' learning of other unknown words besides the target words from the difference between the VGRT for

the other unknown words and the Vocabulary Pretest for other unknown words.

Although there were seven students in the control group learned no word, all other 83 students learned certain words from knowing some vague idea of a word (0.5 points) to getting to know most of the words (27.5 points) by a participant in the experimental group. Moreover, this table provides a detailed picture of how well the EBEVOL Model could help subjects learn other new words besides the target words by comparing the experimental group with the control group.

**Table 4.9 Frequency of the difference for other unknown words between VGRT and the Vocabulary Pretest * group crosstabulation**

| | Points | Group | | Total |
|---|---|---|---|---|
| | | 1 | 2 | |
| VGRT-pretest (other unknown words) | .00 | 0 | 7 | 7 |
| | .50 | 4 | 8 | 12 |
| | 1.00 | 3 | 3 | 6 |
| | 1.50 | 1 | 2 | 3 |
| | 2.00 | 3 | 3 | 6 |
| | 2.50 | 2 | 0 | 2 |
| | 3.00 | 0 | 3 | 3 |
| | 3.50 | 3 | 3 | 6 |
| | 4.00 | 2 | 0 | 2 |
| | 4.50 | 1 | 2 | 3 |
| | 5.00 | 1 | 2 | 3 |
| | 5.50 | 3 | 4 | 7 |
| | 6.00 | 1 | 0 | 1 |
| | 6.50 | 0 | 1 | 1 |
| | 7.00 | 0 | 1 | 1 |
| | 7.50 | 1 | 0 | 1 |
| | 8.00 | 0 | 1 | 1 |
| | 9.00 | 2 | 0 | 2 |
| | 9.50 | 2 | 1 | 3 |
| | 10.00 | 0 | 1 | 1 |
| | 10.50 | 2 | 0 | 2 |
| | 11.00 | 0 | 1 | 1 |
| | 11.50 | 0 | 1 | 1 |
| | 12.00 | 0 | 1 | 1 |
| | 13.50 | 2 | 0 | 2 |
| | 14.00 | 2 | 0 | 2 |
| | 14.50 | 2 | 0 | 2 |
| | 15.50 | 1 | 0 | 1 |

| | Points | Group | | Total |
|---|---|---|---|---|
| | | 1 | 2 | |
| | 17.50 | 2 | 0 | 2 |
| | 19.00 | 1 | 0 | 1 |
| | 20.00 | 1 | 0 | 1 |
| | 21.50 | 1 | 0 | 1 |
| | 25.00 | 1 | 0 | 1 |
| | 27.50 | 1 | 0 | 1 |
| Total | | 45 | 45 | 90 |

Note: Group 1= experimental group; Group 2= control group

The difference between VGRT for other unknown words and the Vocabulary Pretest for other unknown words was analyzed according to the two groups (see Table 4.10). Subjects in the experimental group learned averagely 8.4667 new words while those in the control group learned 3.3778 words.

**Table 4.10 Group Statistics of the difference for other unknown words between VGRT and the Vocabulary Pretest**

| | Group | N | Mean | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| VGRT-pretest | 1 | 45 | 8.4667 | 7.22873 | 1.07760 |
| (other unknown words) | 2 | 45 | 3.3778 | 3.45779 | .51546 |

Note: Group 1= experimental group; Group 2= control group

After presenting the basic data concerning the subjects' performance difference between the VGRT and the Vocabulary Pretest, the Independent Samples t-test was applied to check if there existed a significant difference between the two groups (See Table 4.11).

**Table 4.11 Independent t-test results of the difference for other unknown words between VGRT and the Vocabulary Pretest**

| | t value | Df | Significance. (2-tailed) |
|---|---|---|---|
| VGRT-pretest (other unknown words) | 4.260 | 88 | .000 |

A significant difference was found in the learning of other unknown words between the experimental group (M=8.4667, SD=7.22873) and the control group (M=3.3778, SD=.51546); t(88)=4.260, p=.000.

## 4.5 Answer to Research Question 4:

**Question 4: "Is there a correlation between learners' lookup frequency and their vocabulary scores?"**

The subjects' lookup behavior was an important variable revealing how they got to know the new words with the help of an e-dictionary. Research Question 4 aimed to investigate if learners' lookup behavior of the target words could reveal some truth. Since different learners had a different list of unknown words, the data concerning other words besides the twelve target words were excluded from analysis for this question.

The independent variable in Research Question Four was lookup frequency and the dependent variable was vocabulary gain and retention. Only the data related to the target words were analyzed. The Pearson correlation coefficient between lookup frequency and vocabulary gain and retention, i.e., the four tests, concerning the target words was counted by bivariate correlation for four times in order to answer this question (see Table 4.12).

**Table 4.12 Correlations between LUB and vocabulary gain and retention**

| | | VGPT | VRPT | VGRT(TWs) | VRRT(TWs) |
|---|---|---|---|---|---|
| LUB (TWs) | Pearson Correlation | .125 | .095 | .270 | -.249 |
| | Sig. (2-tailed) | .413 | .534 | .073 | .099 |
| | N | 45 | 45 | 45 | 45 |

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

There was no significant correlation found from the table (p. =.413, .534, .073, .099). Therefore, how many times the learner looks up a word did not determine if he could learn the word. Other factors might be more important, such as the degree of attention intensity or if the learner chooses to memorize the word.

## 4.6 Answer to Research Question 5

**Research Question 5: "What are the reasons for the preferences of this vocabulary instruction program?"**

For Research Question 5, the hypothesis was that the subjects liked this vocabulary instruction program. It was proved by the open-ended questionnaire administered together with the delayed tests one month later after the experiment (see Table 4.13). The questionnaire investigated their satisfaction towards the program. The students' answers towards the question asking if they like the program were grouped into three categories: like, neutral, and dislike. Answers as "like", "like very much" were treated as "like" category and answers as "dislike", "dislike strongly" were treated as "dislike" category. The answer like "I think the program is so so." was classified into the "neutral" category.

Table 4.13 shows that 37 students out of the 45 subjects in the experimental group like the program. The preference percentage is 82.2%. It shows that most of the students in the experimental group held a positive opinion towards the vocabulary instruction program.

**Table 4.13 Preferences of the vocabulary instruction program**

| | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|
| 1 | 37 | 82.2 | 82.2 | 82.2 |
| 2 | 4 | 8.9 | 8.9 | 91.1 |
| 3 | 4 | 8.9 | 8.9 | 100.0 |
| Total | 45 | 100.0 | 100.0 | |

Note: 1=like, 2=neutral, 3=dislike

The subjects were required to write down their comments on the program from which the reasons for their preferences of the vocabulary instruction program were found. A student concluded the merits of the program into two phrases: “the convenience of an e-dictionary and repeated memorization for the same words”. Several students commented that learning words in the program was “simple, convenient, practical”.

To sum up, there were five main reasons for the subjects’ positive attitudes towards the program:

1. High efficiency of learning words

The majority of the participants, occupying 82.2 percent, expressed their preference to the program because they felt that it did help them memorize new words. One student wrote, “I memorized many words not sure of and get to know many new words”. Most of the subjects admitted that they felt “the program is efficient in helping them memorize words”. This is the major reason for their preferences.

2. The convenience of the e-dictionary

Forty percent of the students admitted that the e-dictionary equipped in the program helped them learn vocabulary. They pointed out that the dictionary in the

program provided convenience and quickness for knowing the meaning of new words. They like the e-dictionary. Students commented:

"I could consult the e-dictionary whenever I like. It saved time, improved my reading efficiency and knew new words."

"The e-dictionary helped me know the meaning of new words immediately therefore I could read the interesting story fluently."

3. As a new, unique, interesting and challenging method for word learning

The program was described by 26.7 percent of the participants as being new, unique, interesting and challenging. Students' comments concerning this point are listed as follows:

-"I like the program very much. This program turns vocabulary memorization into an interesting test, and I learned the words happily."

-"It's a new form of vocabulary learning. My curiosity, impetus, and passion to learn (words) were aroused."

-"It helped me to memorize words in an associative way with repeated chances. We were forced to retrieve the words and the impressions were deepened. It is a much more interesting way, not dull or tedious at all."

-"This program is good. It reminds us that we have a small vocabulary. We can learn vocabulary and practice reading comprehension at the same time."

-"The mistakes in the Vocabulary Pretest created a deep impression for the words when they were encountered later. "

-"My curiosity was aroused from the mistakes."

-"It was full of challenges and made me more sensitive to new words. "

-"This program stimulated me to reflect/consider."

-“Without the dullness and tediousness of memorizing words by rote, it was easier for me to remember the words appeared in sentences in this program. ”

4. Repeated drills on a same word

Fifteen point six percent of the learners pointed out that repetition was a major reason to explain the high efficiency of the program for learning words. The repeated requirements for word retrieval created the external need for the learners to learn words. The effects of repetition are shown from the students’ words:

-“The words appeared repeatedly. My impression on them were deepened”

-“The words were drilled repeatedly. This had deepened my memorization of the words. ”

-“The program made us memorize the words in a repeated way.”

-“In the program, the words in the passage appeared again and again. This made us try our best to memorize them and at the same time to pay attention to any word we didn’t’ know.

-“The idea in the program is in accord with the memorization rules.”

-“The program stimulated my brain to retrieve the words repeatedly, my potential were activated.”

5. New words appeared in context

The value of context for word learning was mentioned by twenty two point two percent of the students that learning words in context was easier than in isolation. Some students commented:

“The program helped me to know the meanings of words in the passage and therefore I could understand the passage and remember some words.”

“In this program, the new words appeared in sentences. When we understood the sentences, the words were remembered better (than words in isolation).”

## 4.7 Results of the T/F comprehension test

After the five research questions answered, what worth to mention is about the result of the T/F comprehension test (see Table 4.14) which was different from that of the pilot study. A significant difference in learners' achievements in the T/F comprehension test at the significance lever of .05 was found in the study between the experimental group (M=20.5778, SD=4.33531) and the control group (M=18.2556, SD= 4.8308), t(88) =2.4, p= .019

**Table 4.14 Independent t-test results of T/F comprehension test**

| | t value | df | Significance. (2-tailed) |
|---|---|---|---|
| T/F comprehension test | 2.4 | 88 | .019 |

Note: Significance level is at .o5.

This demonstrates the EBEVOL Model not only succeeded in helping the learners learn vocabulary but also helping them understand the text better.

The reliability of the T/F comprehension test in the study is .7862.

## 4.8 Summary

This chapter reports the results of the present study in the order of answering the five research questions. Significant differences were found between the experimental group and the control group in learning new words, i.e., target words and other new words besides target words. Most of the subjects liked the program with EBEVOL Model helping them learn vocabulary. Moreover, a significant difference was found in reading comprehension between the experimental group and the control group. The EBEVOL Model was proved effective.

# CHAPTER 5

# THE E-DICTIONARY-BASED ENHANCERS FOR VOCABULARY LEARNING MODEL

Based on the findings in Chapter 4, this chapter begins with listing the fundamental elements for helping learners learn vocabulary under e-dictionary-based enhancement techniques while reading a text. The E-dictionary-Based Enhancers for Vocabulary Learning Model (EBEVOL Model) is proposed in the second part.

## 5.1 Model elements

This vocabulary-learning model is composed of three main enhancement techniques/ e-dictionary-based enhancers: a forewarned comprehension test, while-reading word relevance and a matching task. They make learners elaborate the TWs by noticing them first and then retrieving them bidirectionally in terms of their form and meaning. However, three e-dictionary-based enhancers alone are not to make up a good vocabulary-learning model. There are other necessary elements to make the model complete and more effective, i.e., the Vocabulary Pretest and the vocabulary posttests (VGPT, VGRT).

Although the main purpose of the model is to help learners learn TWs, the results of both the pilot study and the main study revealed that the EBEVOL Model also succeeded in helping the participants learn other unknown words besides the TWs. Regarding the learning of other unknown words besides the TWs as the “side effects” of the model, its function of helping learners learn non-target words is explored and discussed together.

### 5.1.1 Vocabulary Pretest

The vocabulary pretest was designed for the experiment out of the two purposes: 1) to make sure that the target words are unknown to all of the participants; and 2) to find out other unknown words for each student. It was not considered as a part of the model originally. Figure 5.1 shows a part of the Vocabulary Pretest in the program.

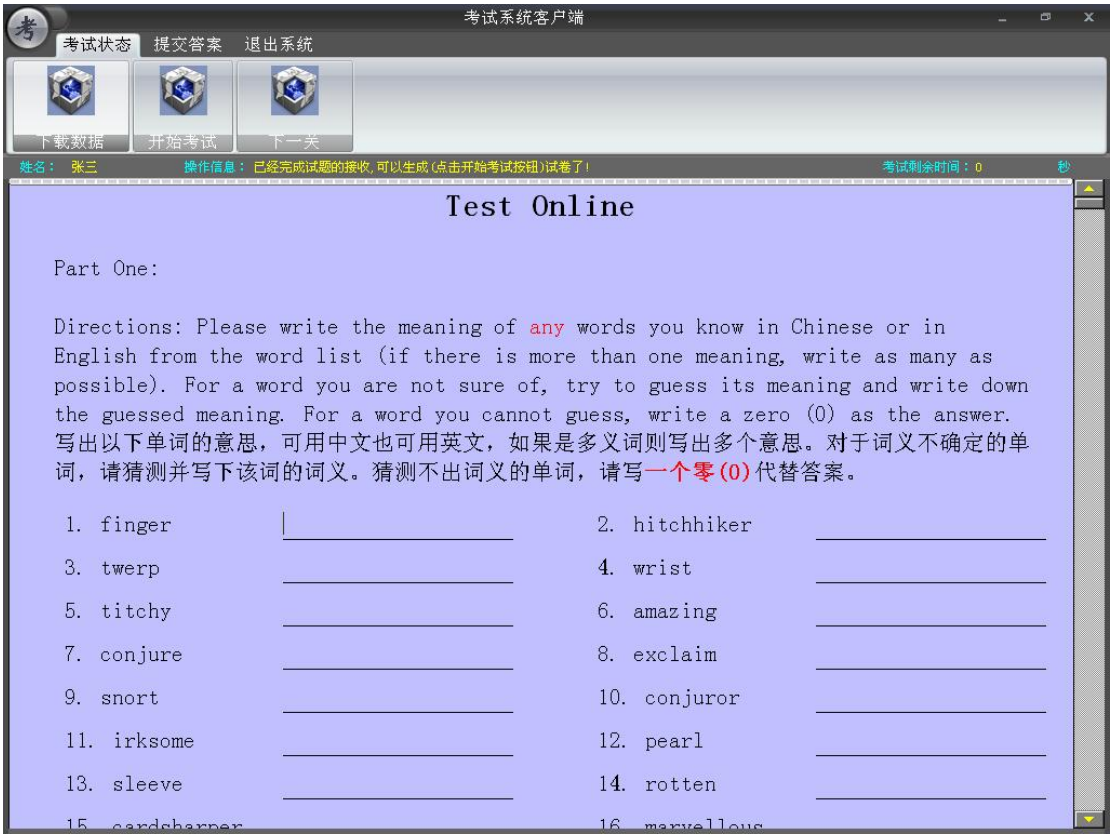



**Figure 5.1 A part of the Vocabulary Pretest**

A third effect of the Vocabulary Pretest was found from the participants' answers to the open-ended questionnaire when they commented on the program:

"The mistakes in the Vocabulary Pretest created a deep impression on the words when encountered again later."

-"My curiosity was aroused from the mistakes."

-"It was full of challenges and made me be more sensitive to new words. "

-"… We were forced to retrieve the words and our impressions on them were deepened. This is a much more interesting way for vocabulary learning, not dull or tedious at all."

-"This is a new form of vocabulary learning. My curiosity, impetus, and passion to learn (words) were aroused."

In a word, the Vocabulary Pretest proposed such a challenge to the participants that an external "need" for them to know the words listed was imposed upon them by the test. Consequently, the Vocabulary Pretest made them "notice" the words that they did not know and "notice" the words they failed to remember which were not brand new to them. One participant commented, "…This program is good. It reminds us that we have a small vocabulary." The awareness of inefficiencies exposed by the Vocabulary Pretest implies the possibility of a deeper impression on the same words when they were encountered later with the convenience of an e-dictionary provided for discovering their meaning. The Vocabulary Pretest is taken as an element of the EBEVOL Model because it succeeds in "drawing learners' attention to the words themselves", which is "primary" for vocabulary learning (Nation, 2001).

### 5.1.2 Forewarned T/F comprehension test for noticing new words

The aim of the EBEVOL Model is to help learners learn target words while reading an article. It is in accord with the spirit of intensive reading course. The forewarned T/F comprehension test is the first enhancer of the three to start the treatment for learning TWs. At the same time, it can have a "side effect" on making learners learn other unknown words in the text for each learner. The saying that "to kill two birds with one stone" is the true reflection of the two functions of the Forewarned T/F comprehension test.

The participants in the experiment were forewarned of the T/F comprehension test. They were required to comprehend the text thoroughly with the help of an e-dictionary. They were told that the test was coming after reading when the text and the dictionary were no longer

available. Therefore, for a clear understanding of the information the passage conveys, learners would focus on all of the words which obstacle their comprehension. The purpose was achieved by the forewarned T/F comprehension test to make learners “notice” relevant words they did not know including target words. A holistic picture was given to the enhanced effects of the e-dictionary on vocabulary learning while reading from both the learning of certain target words and the learning of other unknown words for each participant. For one aspect, the significant difference in learning target words between the experimental group and the control was under the effects of the three enhancers including the forewarned T/F comprehension test. For another, the forewarned T/F comprehension test was proved effective by the significant difference in learning other unknown words between the experimental group and the control group.

### 5.1.3 E-dictionary

The e-dictionary is the core of the EBEVOL Model. All of the enhancers are based on it. The dictionary embedded in the program provides convenience and quickness for the participants to know the meaning of new words. The e-dictionary helps learners learn both the target words and other unknown words.

There are three major types of dictionaries in terms of the languages they use, bilingual dictionaries, monolingual dictionaries, and bilingualised dictionaries. Bilingual dictionaries are liked by language beginners because the explanations in the dictionaries are written in their mother tongue. Learners with higher language proficiency, however, may like monolingual dictionaries better because the word definitions are written in the target language. Bilingualised dictionaries may satisfy all learners’ need by providing definitions in the target language and explanations in learners’ mother tongue as well for the words.

Which type of dictionary in terms of the language it uses can be used in the model is determined by if the dictionary creates the essential condition for occurrences

of elaboration on words. The elaboration refers to the language shifts between the written form and the Chinese meaning of words when learners answer the questions of the two while-reading enhancers (for details see Section 5.1.4 in Chapter 5). In this case, no monolingual dictionary, which involves only the target language, should be applied in this model. Only bilingual or bilingualized dictionaries are proper for the EBEVOL Model. A bilingual dictionary was embedded in the EBEVOL Model in this experiment and succeeded in helping learners learn new words (see Figure 5.2).

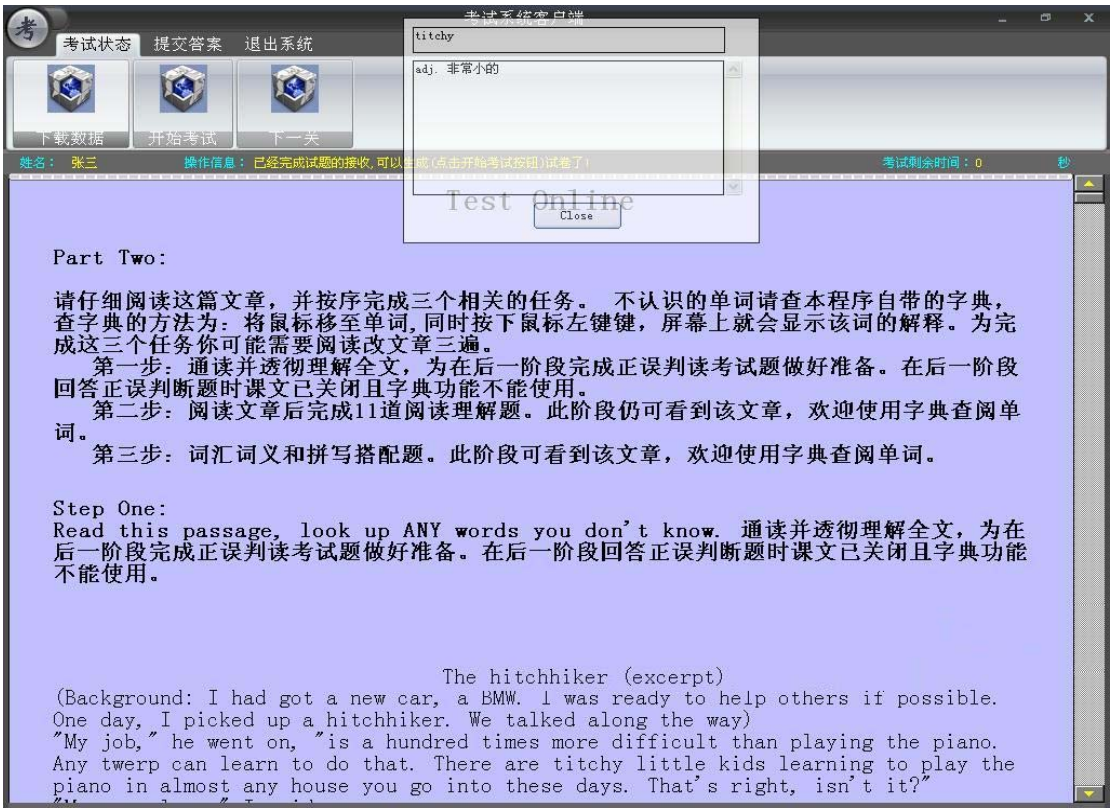
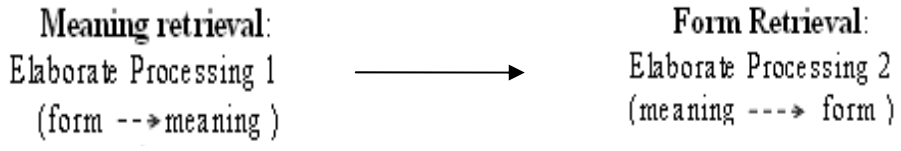



**Figure 5.2 Text with the dictionary information**

### 5.1.4 Two While-reading enhancers

The two while-reading enhancers in the e-dictionary-based model are while-reading word relevance and a matching task. They not only make the learners elaborately process the target words in two ways but also function as a repetition task/repetition tasks once the target

words being noticed by them. These two enhancers are while-reading tasks during which the text is open and the e-dictionary is available. While-reading word relevance is for meaning retrieval and the matching task is for form retrieval.




Word relevance is called while-reading word relevance in order to distinguish it from the T/F comprehension test, which also involves certain ideas of relevance. The learners are required to answer the questions of while-reading word relevance in Chinese according to the text (see Figure 5.3). Two steps are involved in answering such a question. For example, when the students answered Question One “What kind of person can learn to play the piano?”, they have to firstly find the related sentence from the text, “Any twerp can learn to do that” (playing the piano). However, *twerp* was not the answer to the question. Secondly, they had to find its meaning “傻瓜” from the e-dictionary as the right answer to the question. In this way, the form and meaning connection of the target word “twerp” is elaborated.

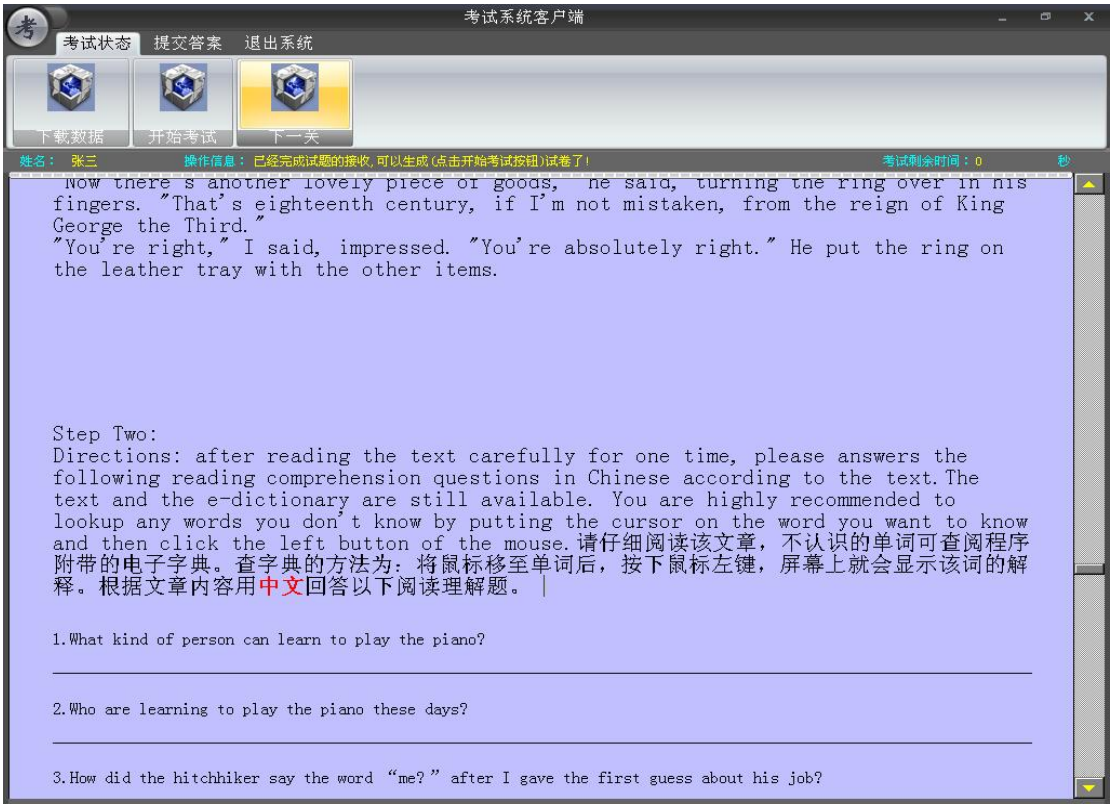



**Figure 5.3 While-reading word relevance (a part)**

Inspired by the L2-L1 pair, one of the vocabulary exercises recommended by Laufer and Hill (2000), a matching task is designed as the vocabulary task to make learners elaborate target words from strengthening the meaning and form connection of the words. The matching task is given to learners as the vocabulary exercises in order to help learners acquire the written form of the target words (referred to as productive knowledge). The learners are required to spell the target words according to their Chinese meaning in the task (see Step Three in Figure 5.4).

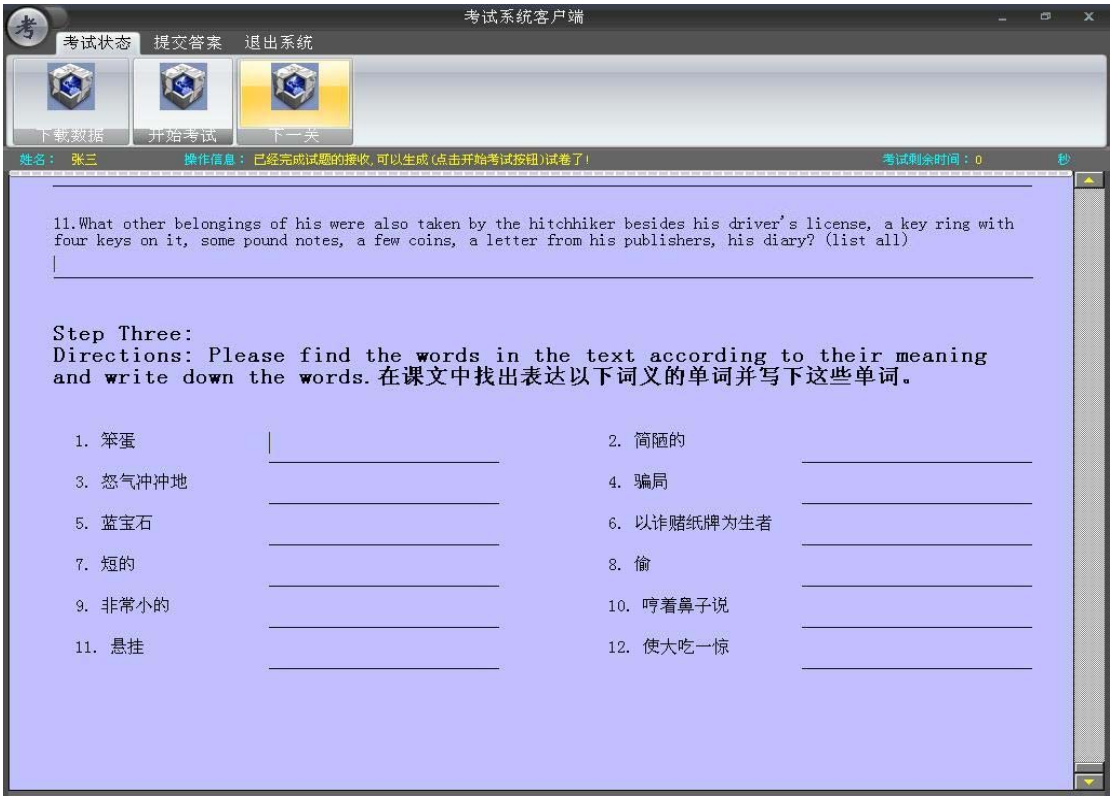



**Figure 5.4 The matching task**

The elaboration on the words' meaning and form connection is realized by language shifts in the matching task. The learners are required to find the written form of the target words according to their Chinese meaning. Therefore, the learners have to either retrieve the TWs' spelling form or look up these words in the dictionary again for its Chinese equivalent to ensure a correct match if they failed in doing so. Transition between the target words and their Chinese equivalent is the key of the elaboration for this enhancer as well as while-reading word relevance. Both while-reading word relevance and the matching task in this model create chances to make learners "do with words" except that the vocabulary task is more word-directed than word relevance.

In fact, the two enhancers have two functions: 1) making learners elaborate the form and meaning connection of the TWs bidirectionally as mentioned in the former part and 2) as a

repetition task / a consolidation task. For stable word retention, a selection of vocabulary exercises (Laufer and Hill, 2000) or word-focused activities (Peters et al., 2009) were used to consolidate furtherly word knowledge besides word relevance in some studies. The necessity of the consolidation task is mentioned by several researchers. Baddeley (1997, cited in Peters et al., 2009, p. 115) points out that “learners should be exposed to the new words again as soon as possible after the first encounter in order to reinforce the form-meaning connections of these words”. Many researchers (Baddeley; Hulstijn; Nation, 2001, cited in Peters et al., 2009, p. 115) believe that “immediate repetition of a word after its initial encounter is especially beneficial for word learning”. In the EBEVOL Model, not only the matching task but also the task of while-reading word relevance function as repetition tasks as well as their function of making learners elaborate the target words. They are double functioned. One of the participants commented on the program in the open-ended questionnaire: “I like the program very much. This program turns vocabulary memorization into an interesting test, and I learned the words happily”. The main reason that the students learn the words happily is for the sake of the two enhancers. The two enhancers lead their attention to the words and induce them to memorize them step by step without feeling the dullness of rote memorization.

### 5.1.5 Two vocabulary posttests and the T/F comprehension test

#### 1) Two vocabulary posttests

The two immediate vocabulary posttests in the program are included into the EBEVOL Model. The forced output may be a part of the learning activity. The productive test comes before the receptive test. The fixed order of the two tests is because that the retrieval of productive knowledge is more challenging than that of receptive knowledge (see Figure 5.5 & Figure 5.6).


**Figure 5.5 Vocabulary posttest 1 (VGPT)**


**Figure 5.6 Vocabulary posttest 2 (VGRT)**

The two vocabulary posttests aim to check if the learners master the productive knowledge and the receptive knowledge of the target words or not. At the same time, the two tests make them retrieve the form and meaning connection of the target words again. The receptive test makes them retrieve the meaning of other unknown words. The learners are challenged again by these tests. After the experiment, some students commented:

-“The program stimulated my brain to retrieve the words repeatedly, my potential were activated.”

-“The program made us memorize the words in a repeated way.”

“The words appeared repeatedly. My impression on them are deepened”

-“The words were drilled repeatedly. This has deepened my memorization of the words. ”

Therefore, the two vocabulary posttest are regarded as a part of the vocabulary-learning model. However, for the best effects of the vocabulary tests, the receptive test need to be improved by the program to avoid containing words they know in the Vocabulary Pretest for each participant (for detail see Section 6.3.3 in Chapter 6).

**2) T/F comprehension test**

After the vocabulary posttests, the true or false comprehension test is administrated to check readers’ understanding of the text as forewarned (see Figure 5.7). The forewarned T/F comprehension test makes the learners pay attention to words hindered their comprehension and it provides an opportunity for learners to practice reading comprehension at the same time. It is to kill two birds with one stone.

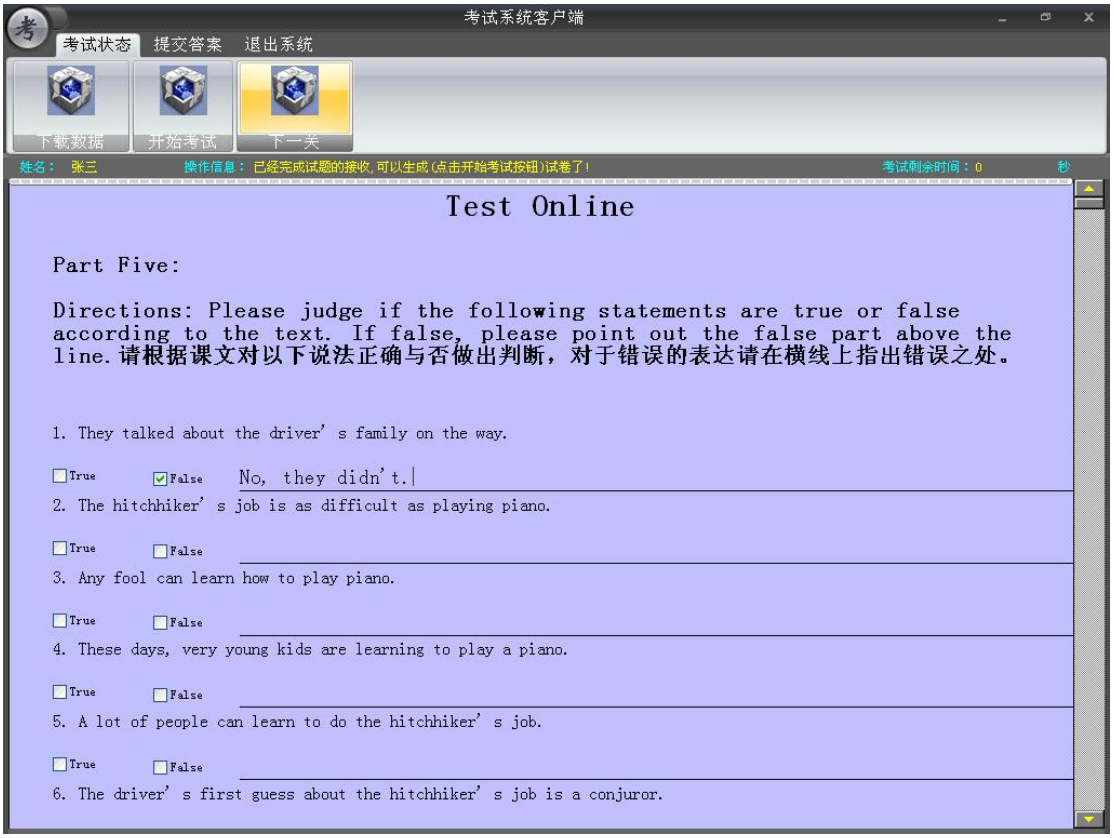



**Figure 5.7 A part of the T/F comprehension test**

A significant difference in reading comprehension has been found between the experimental group and the control group in the study. It proves the EBEVOL Model succeeds in helping learners learn new words and improving their comprehension as well. It is as some students commented, “the program helped me to know the meanings of words in the passage and therefore I could understand the passage and remember some words.”

## 5.2 Details of E-dictionary-Based Enhancers for Vocabulary Learning Model

The E-dictionary-based Enhancers for Vocabulary Learning Model is explored in this study aiming at optimizing the effectiveness of e-dictionary use for vocabulary learning while reading based on the findings from previous studies in this field (Laufer and Hill, 2000; Peters, 2007; Peters et. al., 2009). The EBEVOL Model is introduced from its purposes and its procedures.

### 5.2.1 Purposes of the EBEVOL Model

The general purpose of the EBEVOL Model is to help learners learn vocabulary while reading an article. The two main purposes are:

1. To help learners learn the meaning and the written form of certain target words (around 12-16 words);

2. To help learners learn the meaning of other unknown words besides target words in the test.

### 5.2.2 Procedures of the EBEVOL Model:

According to the necessary elements of the EBEVOL Model, its procedures can be listed as a figure. The whole EBEVOL Model is shown by Figure 5.8. There are three main phases in the model: prior to reading, while reading and post reading (see Figure 5.1). The vocabulary pretest is administrated and the T/F comprehension test is forewarned before reading. The two while-reading tasks, word relevance and the matching task, are carried out while learners are reading the text. Productive vocabulary posttest, receptive vocabulary posttest and the T/F comprehension test are post-reading tests.

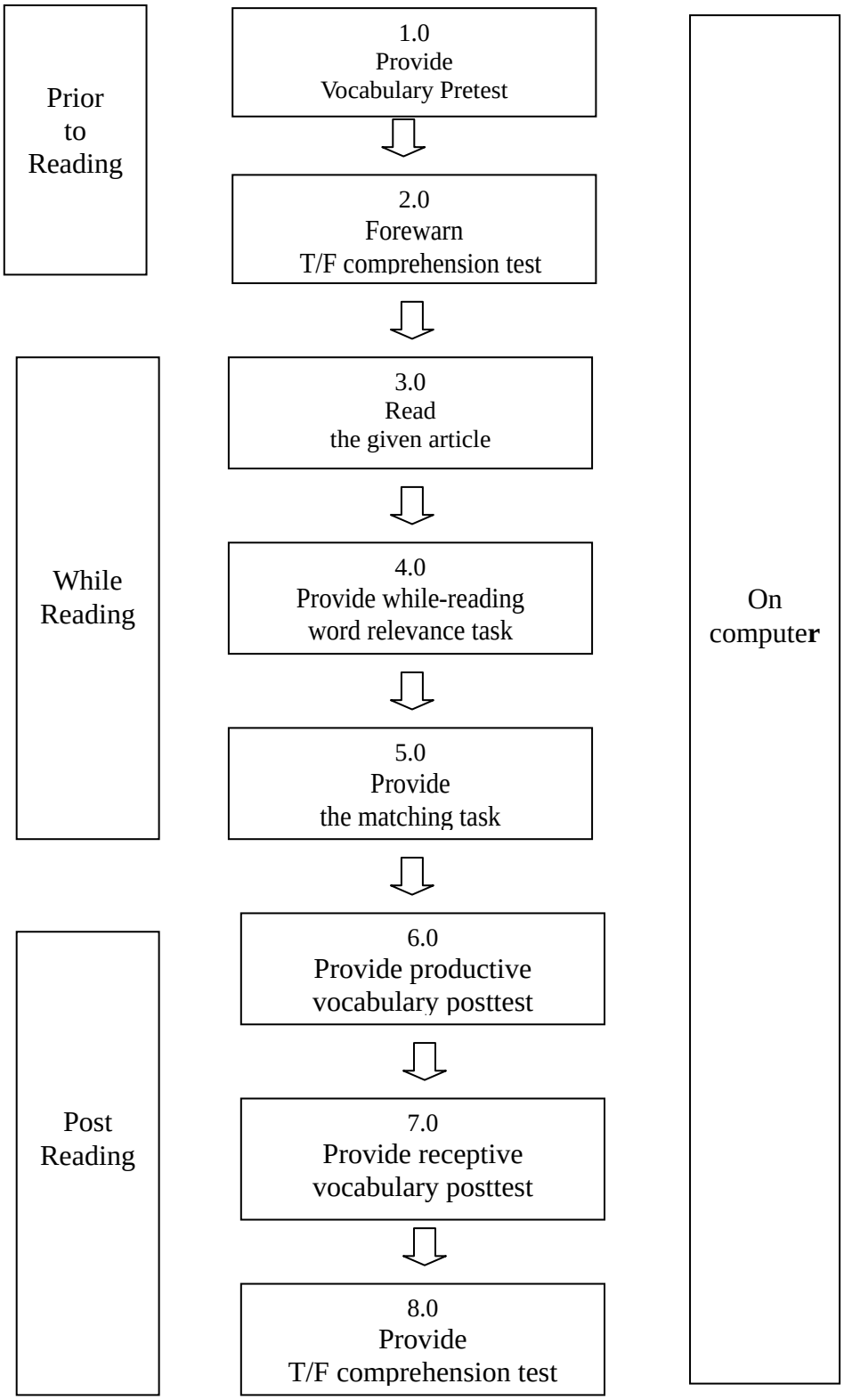



**Figure 5.8 E-dictionary-Based Enhancers for Vocabulary Learning Model**

The first purpose of the model is for helping learners learn target words. All of the elements of the EBEVOL model are involved for it, including the Vocabulary Pretest, the forewarned comprehension test, while-reading word relevance, the matching task, the productive vocabulary posttest, and the receptive vocabulary posttest. However, only the Vocabulary Pretest, the forewarned comprehension test and receptive vocabulary posttest are for the learning of other unknown words for each participant.

## 5.3 Summary

The EBEVOL model is presented in this chapter in detail, including its necessary elements, its purposes and the figure to show its procedures.

# CHAPTER 6

# CONCLUSIONS, IMPLICATIONS AND LIMITATIONS

This final chapter summarizes this study. The first part is the conclusions. Implications and recommendations are made for the application of the EBEVOL Model in the second part. Finally, limitations and suggestions for further research are described.

## 6.1 Conclusions

In order to help learners learn vocabulary, the present study is conducted to develop a vocabulary-learning model enhanced by an e-dictionary (the E-dictionary-Based Enhancer for Vocabulary Learning Model) while reading an article in the computer age. The research purposes of this study are:

1. To develop the EBEVOL Model using three e-dictionary-based enhancement techniques/enhancers for vocabulary learning;

2. To examine how the EBEVOL Model helps the experimental group learn the two types of vocabulary knowledge of the target words immediately and one month later;

3. To examine the effects of the forewarned T/F comprehension test, one of the enhancers, on learning of unknown words besides target words;

4. To explore the relationship between learners' lookup frequency and learners' vocabulary learning achievement;

5. To explore students' satisfaction towards the EBEVOL Model (implemented by a

vocabulary instruction program).

To fulfil these purposes of this study, the following questions are addressed.

1. Is there a significant difference in the learning of the target words ’meaning between the control group and the experimental group?

2. To what extent does the EBEVOL Model help learners learn target words receptively and productively?

3. Do learners in experimental group learn more unknown words besides the target words than those in control group do? If so, to what extent?

4. Is there a correlation between learners’ lookup frequency and their vocabulary scores?

5. What are the reasons for the preferences of this vocabulary instruction program?

One hundred first-year graduate students participated in the experiment during regular class time. They were assigned to an experimental group and a control group according to their scores on the nationwide standardized matriculation English test for graduate students evenly. Ten students know one of the target words in the Vocabulary Pretest were excluded from data analysis.

Three types of instruments were used to collect data in this study. They were five vocabulary tests (a Vocabulary Pretest, VGPT, VGRT, VRPT, and VRRT), a file of the vocabulary instruction program designed specially to record learners’ lookup behavior, and two questionnaires, a five-scaled Likert questionnaire and an open-ended questionnaire for investigating learners’ satisfaction towards the program (the EBEVOL Model).

The study was carried out in two phases. In Phase One, the main phase, the vocabulary instruction was accomplished by the computer program designed specially for this study. The EBEVOL program was carried out within 2-hr in-class time. Two immediate vocabulary

posttests (VGPT and VGRT) were administrated in the program. In Phrase Two, two delayed vocabulary posttests and the open-ended questionnaire were given to the experimental group on paper a month after the instruction.

The findings of the study are summarized according to the five research questions as follows:

1. A significant difference in learning the meaning of the target words was found between the experimental group and the control group. The EBEVOL Model was proved effective to help learners learn the meaning of target words.

2. The participants in the experimental group learned the written form of 4.578 target words and the Chinese meaning of 6.9111 words in average immediately after the treatment. This shows that the EBEVOL Model helped the subjects in the experimental group learned immediately 38.15% of the written form and 57.59% of the meaning of the 12 target words. The best student spelled nine of the target words. Another student learned the meaning of all the target words.

After one month, the students remembered the written form of 3.2 (26.67%) target words in average. They retrieved the Chinese meaning of 5.1889 words (43.24%). The best student wrote eight target words. Nine point five was the highest score in writing the meaning of these words.

3. The effects of the EBEVOL Model on words learning besides target words were shown by the answer to Question Three. Therefore, a picture was given to the effects of the EBEVOL Model on vocabulary learning. A significant difference was found between the experimental group and the control group in learning other unknown words besides the target words. The participants in the experimental group learned much more words besides the target words than those in the control group did.

4. No significant correlation was found between the lookup frequency and vocabulary gain and retention (the four vocabulary posttests) concerning the target words.

5. The program (the EBEVOL Model) was liked by 82.2% participants in the experimental group. According to the open-ended questionnaire, there were five main reasons for their positive attitudes towards the program:

- High efficiency of learning words

Most of the subjects admitted that “the program helped them memorize words”. They felt that the efficiency of learning new words was much higher (than rote memorization).

- The convenience of the e-dictionary

Many students admitted that the e-dictionary equipped in the program helped them understand the meaning of new words very quickly. By putting the cursor on any word the learners want to look up, its meaning appears promptly.

- As a new, unique, interesting and challenging method for word learning

The way to learn vocabulary in the program is new, unique, interesting and challenging. It was totally different from rote memorization, which was not fun at all.

- Repeated drills on a same word

Some participants attributed the learning of the words to repeated chances of drilling on a same word.

- New words appeared in context.

Some participants pointed out that when they understood the sentences in the text, the words in the sentences were remembered better (than words in isolation).

All in all, this study demonstrates the effects of enhanced e-dictionary use while learners read a text. We can have a glimpse of the benefits of dictionary or glossing from several studies

in this field. Mondria's (1993, cited in Laufer and Hill, 2000) learners remembered 15% of them (out of 14 target words from 14 sentences) on a post-test after looking up new words in a dictionary. Knight's (1994) subjects recalled 20% of the meaning of the tested words (out of 14 target words not highlighted in a 250-word text). In Hulstijn, Hollander, and Greidanus' study (1996), learners remembered 25% of the looked up words' meaning (out of 16 target words not highlighted in a 1306-word text) when the word appeared in the text once. Moreover, in Laufer and Hill's study (2000), the Israeli group remembered 33.3% of the words (out of 12 highlighted target words in a 120-word text) by writing their meaning, the Hong Kong group, 62%. The EBEVOL Model in this study was proved effective to help learners learn the meaning (57.59%) and the written form (38.15%) of target words from e-dictionary use under the combination of enhancement techniques. In fact, few studies in which target words appeared once have measured enhanced vocabulary learning by productive tests. One exception is Chun and Plass' study (1996), which reports 25% accuracy in production tests requiring students to write the English equivalent under the effects of multimedia annotations. Although the means used to help learners learn vocabulary are different, multimedia annotations in Chun and Plass' study and textual definitions in this study, the enhancers of the EBEVOL Model do work for vocabulary learning.

## 6.2 Implications and recommendations

Several implications may be made from the EBEVOL Model supported by the findings. One important implication is that a learner may learn certain words while reading carefully an article for the purpose of thorough comprehension with the help of an e-dictionary. Besides, there are two pedagogical implications: the EBEVOL Model may be applied in a TEFL CALL course for intensive reading or extensive

reading; and it may be made into a self-study program of learning vocabulary.

Meanwhile, three pieces of recommendations are provided for a better vocabulary learning effects, e.g., the choosing of target words and equipping the learners with basic computer skills, and two types of e-dictionaries may be used in the EBEVOL Model.

### 6.2.1 E-dictionary enhanced vocabulary gain while reading for thorough comprehension

The most practical implication of this study is vocabulary gain enhanced by an e-dictionary while reading a text for thorough comprehension. It is from the answer to Research Question Three “do learners in the experimental group learn more unknown words besides the target words than those in the control group do? If so, to what extent?”. A significant difference was found in learning other unknown words besides target words between the learners in the experimental group and those in the control group. The experimental group learned 8.5 words in average and the best learner in this group got to know around 27.5 new words. The good result might be out of the fact that in order to cope with the upcoming T/F comprehension test soon when the text and the e-dictionary were not available, the participants read the text carefully and paid much attention to the words which they failed to recognize when appeared in isolation in the Vocabulary Pretest. Another reason might be that most of the words were not low frequency words. They may have encountered some of the words here and there although not knowing their exact meaning. It might be as some student commented that they recognized some words while reading the text but had failed to make out its meaning when they appeared in isolation in the Vocabulary Pretest.

Anyhow, the forewarned T/F comprehension test as an e-dictionary-based enhancer of the model can lead to learners' vocabulary gain while reading. The essence of this enhancer is the idea of reading for thorough comprehension, which is similar to that of a recall protocol after reading. The recall protocol of a reading text may be accomplished by learners themselves by writing an as detailed description of the text as possible. Therefore, it is possible for autonomous learners to learn vocabulary while reading enhanced by an e-dictionary. This provides learners an effective way of vocabulary learning by themselves. Autonomous learners may make use of the abundant resources of online articles for the purpose of vocabulary learning while reading and searching for information.

### 6.2.2 As a TEFL CALL course

The EBEVOL Model can be applied into EFL teaching practice as a CALL (Computer Aided Language Learning) course for vocabulary learning from reading. It will be a new attempt of making use of technology to help learners learn vocabulary in a language course. The three enhancers together may be used in an intensive reading course and one of the three enhancers, the forewarned (T/F) comprehension test, in an extensive reading course.

In an intensive reading course, the whole EBEVOL Model should be used, including all the three enhancers, i.e., the forewarned T/F comprehension test, while-reading word relevance and the matching task. Vocabulary learning is a main part of intensive reading courses. Therefore, the EBEVOL Model can play a role in these courses. The three enhancers in the model are for learners to learn both the meaning and spelling form of the target words and they will get to know the meaning of some new words besides target words, too.

In an extensive reading course, only the enhancer of the forewarned (T/F) comprehension test should be used in the EBEVOL Model. The essence of this enhancer is a forewarned comprehension test take the form of a T/F comprehension test or a recall protocol. The recall protocol is good for a text, which is not long. The purpose of this enhancer is to make learners pay attention to and get to know the meaning of other unknown words which obstacle their comprehension as well as the target words in the reading process. The other two enhancers, the while-reading word relevance and the matching task are omitted for non-target words since they are designed for learning the TWs. As there are no while-reading exercises, there is no intrusion from exercises to spoil the happiness of smooth reading. The benefit of this enhanced e-dictionary use is to help learners learn new words while understanding the text, as one participant commented, "…The new words appear in sentences. When we understand the sentences, the words are remembered better (than words in isolation)".

### 6.2.3 A program for self study

A vocabulary-learning program may be developed according to the theoretical concepts of the EBEVOL Model for helping learners learn vocabulary in a systematic way. It may be for learning words at different vocabulary levels, e.g., the most frequent 1000 words, the most frequent 1001-2000 words, Academic Word List, University Word List, etc.

This self-study program is for learners to learn words outside class. It may be used anytime anywhere as learners like after it has been installed in the learners' computer. With this kind of program, EFL learners are provided not only opportunities of autonomous learning, but also a tool for a more fruitful vocabulary learning/acquisition.

### 6.2.4 Better not low-frequency words as target words

Similar studies usually choose low-frequent words or pseudo-words as the target words to make sure no subjects know any of them beforehand in order to check the effectiveness of its instruction of vocabulary. However, in the vocabulary teaching and learning practice, low frequency words are not proper to be chosen as TWs. One participant complained in the questionnaire, “There are too many new low-frequency words in the text, it’s not easy for us to remember them”. It is more useful for learners to learn words they may encounter frequently and have chances to use them frequently.

### 6.2.5 Equipping the learners with basic computer skills

The participants in this study were graduate students. Their answers to one item of Questionnaire One, “I feel comfortable at using computer”, demonstrate that almost all of them were equipped with basic knowledge of computer skills with only one exception that one student felt uncomfortable at using computer. Among the participants, 68.9% of them felt comfortable at using computer and 28.9% of them held a neutral attitude. A conclusion may be reached that basic computer skills are required for learners to make good use of any program designed according to the EBEVOL Model.

### 6.2.6 Two types of dictionary proper

There are three types of dictionary in terms of language it uses, bilingual dictionaries, monolingual dictionaries, and bilingualised dictionaries. Theoretically, both bilingual dictionaries and bilingualized dictionaries are suitable for the EBEVOL Model because both of them satisfy the enhancers’ requirement of making learners elaborate the form and meaning connection of the target words by language shifts.

Both the dictionaries involve a target language and learners' mother tongue (see Section 5.1.3 in Chapter 5).

According to Questionnaire One, the preference percentage of participants to Chinese explanation was 75.6%, and 57.8% was for bilingualized information. What type of the two dictionaries help learners most may be one question to be explored in a future study.

## 6.3 Limitations and suggestions for further research

Generally, the results of the present study prove the effectiveness of the E-dictionary-Based Enhancers for Vocabulary Learning Model on helping learners learn vocabulary. Some deficiencies of the program were exposed as well from the participants' feedbacks in the two questionnaires. According to these limitations, corresponding suggestions are proposed.

### 6.3.1 Many new words to memorize for some of the participants

The sample was taken from graduate students, whose English proficiencies were supposed comparatively high. However, for some of them, there were still many new words to be memorized. According to the Vocabulary Pretest, students have 38 new words in average to learn out of 57 chosen words and the medium of their score in the same test is17.5. This is to say, a little bit more than half of the participants have more than 38 words to learn. The large quantity of new words to be memorized proposed a heavy learning load to them, not to mention the worst participant who did not know 55 words according to the Vocabulary Pretest. Some student commented later, "…a lot of work. It is fatiguesome….".

Even though, the most capable student learned around 28 new words (See Table 4.7 in p. 109) besides the target words according to the immediate receptive vocabulary test. It may be assumed that around 40 new words (28 other unknown words plus twelve target words) might be the maximum for the learners to learn within one time.

### 6.3.2 Limited dictionary information

In order to investigate the effects of learners' lookup behavior, limited dictionary information was provided to learners in order to control the experiment rigorously in this study (see Section 3.4 in Chapter 3). The displayed dictionary information of the self-designed dictionary in the experiment program only included the Chinese explanation and its part of speech.

According to Questionnaire One, most students wanted to hear the words, and see more information of the words, e.g., the printed pronunciation and phrase or sentence examples of their usages. It may be supposed that a much deeper impression to the new word may be created when they know how to pronounce the word and the collocation of the word in another phrase or sentence. These factors may improve learners' vocabulary achievement. This may be a focus of a future study.

### 6.3.3 Some functions of the program to be improved

To investigate the effects of the EBEVOL Model, a program has been designed specially for this study. The program fulfilled its mission successfully. However, some functions may be improved for better use in the future.

In this study, the participants were required to take the same pretest and posttests although their lists of unknown words were different from each other. They had to repeat their answers of the meaning to some words known. In the future, the

program may be designed with the function that according to learners' performance in the Vocabulary Pretest, their list of unknown words is formed automatically by the program as the content of the vocabulary posttest. Therefore, any word known for each learner does not appear in his/her vocabulary posttest.

Another function to be improved is to provide the keys to questions for learners' reference (except for the Vocabulary Pretest) after they submit their answers. This is a suggestion from some participants. Standard answers can be provided for learners to contrast although their subjective answers to the exercises and tests in the EBEVOL Model cannot be judged automatically by the program.

### 6.3.4 Combining the model with rote memorization for better effect

The EBEVOL Model is designed to make learners notice new words and elaborate some of them. The model is to make learners feel the *need* of knowing words. In nature, the need was a *need from outside* for learners. Lots of the participants felt the challenges from the program and were inspired to memorize actively the words they wanted to know. The *need from outside* was turned into *a need from inside* for those students in this case. However, there were other students not experienced this transition. For these participants, rote memorization was the most efficient way of vocabulary learning, which was mentioned by them in the questionnaire. For the sake of these learners, the program may be modified a little bit to recommend rote memorization learners after they submit a wrong answer to the vocabulary posttests by requiring them to memorize the word directly.

In fact, the participants in this study did not know that the program was for learning vocabulary because they were told that they were going to take a reading comprehension test at the beginning of the experiment. They did not have the idea

that the vocabulary tests were coming, therefore, purposive memorization of words for vocabulary tests was decreased to a very small degree.

The learning effect of vocabulary may be better if the participants treat the program as a vocabulary instruction tool and try their best to learn words. A better effect for vocabulary learning may be expected from the combination of rote memorization with the EBEVOL Model.

### 6.3.5 Similar research should be conducted with other groups of students

College students were chosen as the subjects in the pilot study and graduate students in the main study. In both the pilot study and the main study, the EBEVOL Model was proved effective in helping learners learn new words. based on the hypothesis that the EBEVOL Model may help learners who have the capacity of reading articles in the target language learn vocabulary, further studies can focus on learners in other groups, e.g., EFL learners in secondary schools or adult EFL learners, etc. It may be a worthwhile study to focus on the effects of the EBEVOL Model on learners in secondary school due to the fact that there are less low-frequency new words in the their texts and the high frequency words learned in this stage make up their vocabulary size.

## 6.4 Summary

This chapter summarizes the whole study from the five research questions based on research purposes, the sample choosing, the instruments used to collect data and the findings to the research questions.

Two pedagogical implications are drawn: to apply EBEVOL Model in a CALL course and as a source of self study. Three pieces of recommendations are

provided for a better vocabulary learning effects: the choosing of target words, equipping the learners with basic computer skills, and two types of e-dictionaries to be used in the EBEVOL Model.

The limitations of the program are described and corresponding suggestions are proposed to improve the functions of the program.

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# APPENDIX 1

# VOCABULARY PRETEST

Directions: Please write the meaning of **any** words you know in Chinese or in English from the word list (if there is more than one meaning, write as many as possible). For a word you are not sure of, try to guess its meaning and write down the guessed meaning. For a word you cannot guess, write a zero (0) as the answer 写出以下单词的意思，可用中文也可用英文，如果是多义词则写出多个意思。对于词义不确定的单词，请猜测并写下该词的词义。猜测不出词义的单词，请写**一个零(0)**代替答案。

| | |
|---|---|
| 1. finger | 2. hitch-hiker |
| 3. twerp | 4. wrist |
| 5. titchy | 6. amazing |
| 7. conjure | 8. exclaim |
| 9. snort | 10. conjuror |
| 11. irksome | 12. pearl |
| 13. sleeve | 14. rotten |
| 15. cardsharper | 16. marvellous |
| 17. pal | 18. racket |
| 19. leather | 20. license |
| 21. belt | 22. brass |
| 23. buckle | 24. impressed |

25. unsually
26. grin
27. gently
28. miserable
29. flabbergasted
30. nod
31. slide
32. superior
33. loop
34. triumphant
35. shoelace
36. sapphire
37. dangle
38. undo
39. glance
40. ring
41. grief
42. fantastic
43. stubby
44. stuff
45. hitch
46. lap
47. palm
48. absolutely
49. lighter
50. suck
51. tray
52. huffily
53. nick
54. reign
55. jeweller
56. windshield
57. ratty

# APPENDIX 2

# THE READING TEXT

### The hitchhiker (excerpt)

(Background: I had got a new car, a BMW. I was ready to help others if possible. One day, I picked up a hitchhiker. We talked along the way)

"My job," he went on, "is a hundred times more difficult than playing the piano. Any **twerp** can learn to do that. There are **titchy** little kids learning to play the piano in almost any house you go into these days. That's right, isn’t it?"

"More or less," I said.

"Of course it's right. But there's not one person in ten million who can learn to do what I do. Not one in ten million! How about that?"

“Amazing," I said.

"You're damn right it's amazing," he said.

"I think I know what you do;" I said. "You do conjuring tricks. You're a conjuror." "Me?" he **snorted**. "A conjuror? Can you picture me going round **irksome** kids' parties making rabbits come out of top hats?"

"Then you're a card player. You get people into card games and you deal yourself marvellous hands." "Me! A rotten **cardsharper**!" he cried. "That's a miserable **racket** if ever there was one."

"All right. I give up." I was taking the car along slowly now, at no more than forty miles an hour, to make quite sure I wasn't stopped by a policeman again. We had come onto the main London-Oxford road and were running down the hill toward Denham.

Suddenly, my passenger was holding up a black leather belt in his hand. "Ever seen this before?" he asked. The belt had a brass buckle of unusual design.

"Hey!" I said. "That's mine, isn't it? It is mine! Where did you get it?" He grinned and waved the belt gently from side to side. "Where do you think I got it?" he said. "Off the top of your trousers, of course." I reached down and felt for my belt. It was gone.

"You mean you took it off me while we've been driving along?" I asked **flabbergasted**.

He nodded, watching me all the time with those little black ratty eyes.

"That's impossible," I said. "You'd have had to undo the belt and slide the whole thing out through the loops all the way round. I'd have seen you doing it.And even if I hadn't seen you, I'd have felt it."

"Ah, but you didn't, did you?" he said, triumphant.

He dropped the belt on his lap, and now all at once there was a brown shoelace **dangling** from his fingers.

"And what about this, then?" he exclaimed, waving the shoelace.

"What about it?" I said.

"Anyone around here missing a shoelace?" he asked, grinning.

I glanced down at my shoes. The lace of one of them was missing. "Good grief!" I said. "How did you do that? I never saw you bending down."

"You never saw nothing," he said proudly. "You never even saw me move an inch. And you know why?"

"Yes," I said. "Because you've got fantastic fingers."

"Exactly right!" he cried. "You catch on pretty quick, don't you?" He sat back and sucked away at his home-made cigarette, blowing the smoke out in a thin stream against the windshield. He knew he had impressed me greatly with those two tricks, and this made him

very happy. "I don't want to be late," he said.

"What time is it?"

"There's a clock in front of you," I told him.

"I don't trust car clocks," he said. "What does your watch say?"

I hitched up my sleeve to look at the watch on my wrist. It wasn't there. I looked at the man. He looked back at me, grinning.

"You've taken that, too," I said.

He held out his hand and there was my watch lying in his palm. "Nice bit of stuff, this," he said. "Superior quality. Eighteen-carat gold. Easy to sell, too. It's never any trouble getting rid of quality goods."

"I'd like it back, if you don't mind," I said rather **huffily**.

He placed the watch carefully on the leather tray in front of him. "I wouldn't **nick** anything from you, governor ," he said. "You're my pal. You're giving me a lift."

"I'm glad to hear it," I said.

"All I'm doing is answering your question," he went on. "You asked me what I did for a living and I'm showing you."

"What else have you got of mine?" He smiled again, and now he started to take from the pocket of his jacket one thing after another that belonged to me: my driver's license, a key ring with four keys on it, some pound notes, a few coins, a letter from my publishers, my diary, a **stubby** old pencil, a cigarette lighter, and last of all, a beautiful old **sapphire** ring with pearls around it belonging to my wife. I was taking the ring up to a jeweller in London because one of the pearls was missing.

"Now there's another lovely piece of goods," he said, turning the ring over in his fingers. "That's eighteenth century, if I'm not mistaken, from the reign of King George the Third."

"You're right," I said, impressed. "You're absolutely right." He put the ring on the leather tray with the other items.

(Note: the bolded words are the target words. In the program, they were not bolded.)

# APPENDIX 3

# WHILE-READING WORD RELEVANCE RC TASK

**Version 1, for experimental group**

Directions: after reading the text carefully for one time, please answers the following reading comprehension questions in **Chinese** according to the text. The text and **the e-dictionary are still available**. You are highly recommended to lookup any words you don't know. 请仔细阅读该文章，**不认识的单词可查阅程序附带的电子字典。**根据文章内容用**中文**回答以下阅读理解题。

1. What kind of person can learn to play the piano?

   _____

2. Who are learning to play the piano these days?

   _____

3. How did the hitchhiker say the word "me?" after I gave the first guess about his job?

   _____

4. What kind of parties are irksome kid's parties?

   _____

5. What kind of person is a cardsharper?

   _____

6. How did the hitchhiker feel about a cardsharper? Did he like the career?

   _____

7. How did the driver feel when he found he didn't notice that his belt was taken off while he was driving?

_____

8. Where did the driver see his missing shoelace (specify it according to the text)?

_____

9. When the driver found out the hitchhiker had taken his watch, in what kind of way did the driver speak to the hitchhiker?

_____

10. What did the hitchhiker want to do with the driver's missing watch? What does the word "nick" mean?

_____.

11. What other belongings of his were also taken by the hitch-hiker without permission besides his driver's license, a key ring with four keys on it, some pound notes, a few coins, a letter from his publishers, his diary? (list all)

_____.

**Version 2,** for **Control group**

Directions: after reading the text carefully for one time, please answer the following reading comprehension questions according to the text first in English and then in Chinese if possible. 请仔细阅读该文章并根据文章内容回答以下阅读理解题，请用英文回答，并根据你的理解或猜测将答案翻译成中文。

1. What kind of person can learn to play the piano?

_____

2. Who are learning to play the piano these days?

_____

3. How did the hitchhiker say the word “me?” after I gave the first guess about his job?

_____

4. What kind of parties are irksome kid’s parties?

_____

5. What kind of person is a cardsharper?

_____

6. How did the hitchhiker feel about a cardsharper? Did he like the career?

_____

7. How did the driver feel when he found he didn’t notice that his belt was taken off while he was driving?

_____

8. Where did the driver see his missing shoelace (specify it according to the text)?

_____

9. When the driver found out the hitchhiker had taken his watch, in what kind of way did the driver speak to the hitchhiker?

_____

10. What did the hitchhiker want to do with the driver’s missing watch? What does the word “nick” meaning?

_____.

11. What other belongings of his were also taken by the hitch-hiker without permission besides his driver's license, a key ring with four keys on it, some pound notes, a few coins, a letter from his publishers, his diary? (list all)

_____.

# APPENDIX 4

# THE MATCHING TASK

Directions: Please find the words in the text according to their meaning and write down the words. 在课文中找出表达以下词义的单词并写下这些单词。

1. 笨蛋 _____

2. 简陋的 _____

3. 怒气冲冲地 _____

4. 骗局 _____

5. 蓝宝石 _____

6. 以诈赌纸牌为生者 _____

7. 短的 _____

8. 偷 _____

9. 简陋的 ._____

10. 哼着鼻子说 _____

11. 悬挂 _____

12. 使大吃一惊 _____

# APPENDIX 5

# TRUE OR FALSE COMPREHENSION TEST

Directions: Please judge if the following statements are true or false. If false, please point out the false part above the line. 请根据课文对以下说法正确与否做出判断，对于错误的表达请在横线上指出错误之处。

1. They talked about the driver's family on the way.

( ) True ( ) False _____

2. The hitchhiker's job is as difficult as playing piano.

( ) True ( ) False _____

3. Any fool can learn how to play piano.

( ) True ( ) False _____

4. These days, very young kids are learning to play a piano.

( ) True ( ) False _____

5. A lot of people can learn to do the hitchhiker's job.

( ) True ( ) False _____

6. The driver's first guess about the hitchhiker's job is *a conjuror*.

( ) True ( ) False _____

7. The hitchhiker disliked the idea of doing conjuring tricks for children.

( ) True ( ) False _____

8. A cardsharper makes a living by cheating at card games.

( ) True ( ) False _____

9 The hitchhiker liked the idea of tricking others by playing cards.

( ) True ( ) False _____

10. The driver drove fast in order not to be stopped by a policeman.

( ) True ( ) False _____

11. Suddenly, the hitchhiker was holding up a yellow leather belt in his hand.

( ) True ( ) False _____

12. The driver's belt was still on his own trousers.

( ) True ( ) False _____

13. The driver didn't believe that the hitchhiker could take his belt off of him when they were driving along.

( ) True ( ) False _____

14. The hitchhiker had big eyes.

( ) True ( ) False _____

15. The hitchhiker dropped the belt on his lap, and all at once there was a brown shoelace dangling from his fingers.

( ) True ( ) False _____

16. The driver saw the hitchhiker bending down to take his (the driver's) shoelace.

( ) True ( ) False _____

17. The driver smoked a cigarette and blew the smoke out in a thin stream against the windshield.

( ) True ( ) False _____

18. The driver wasn't impressed by the belt and shoelace tricks.

( ) True ( ) False _____

19. The reason the hitchhiker asked the driver to look at the driver's watch for the time is because the hitchhiker didn't trust car clocks.

( ) True ( ) False _____

20. The driver hitched up his sleeve to look at the watch on his wrist.

( ) True ( ) False _____

21. The driver's watch was of good quality, but it was hard to be sold second-hand.

( ) True ( ) False _____

22. The driver thought it was funning that the hitchhiker could take the watch off his wrist without being noticed by him.

( ) True ( ) False _____

23. The hitchhiker handed the watch back to the driver.

( ) True ( ) False _____

24. The hitchhiker didn't want to steal the driver's watch, because the driver was kind to him by giving him a lift.

( ) True ( ) False _____

25. What the hitchhiker had done was to answer the driver's question about what the hitchhiker did for a living.

( ) True ( ) False _____

26. This story happened in America in the eighteenth century.

( ) True ( ) False _____

27. The driver had a long new pencil.

( ) True ( ) False _____

28. The driver had just bought a new sapphire ring for his wife in London.

( ) True ( ) False _____

29. The hitchhiker didn’t return the driver’s belongings to the driver at last.

( ) True ( ) False _____

30. The hitchhiker was a pickpocket.

( ) True ( ) False _____

# APPENDIX 6

# VOCABULARY GAIN PRODUCTIVE TEST (VGPT)

Directions: Please translate the following words into English according to the text.请根据课文写出与以下中文表达相对应的英语单词。

1. 骗局 _____

2. 短的 _____

3. 怒气冲冲地 _____

4. 笨蛋 _____

5. 蓝宝石 _____

6. 以诈赌纸牌为生者 _____

7. 非常小的 _____

8. 使大吃一惊 _____

9. 简陋的 _____

10. 哼着鼻子说 _____

11. 悬挂 _____

12. 偷 _____

# APPENDIX 7

# VOCABULARY GAIN RECEPTIVE TEST (VGRT)

Directions: Please translate the following words into Chinese according to the text. 请根据课文把以下单词翻译成中文。

| | |
|---|---|
| 1. ratty | 2. lighter |
| 3. twerp | 4. wrist |
| 5. titchy | 6. amazing |
| 7. conjure | 8. exclaim |
| 9. snort | 10. conjuror |
| 11. irksome | 12. pearl |
| 13. sleeve | 14. rotten |
| 15. cardsharper | 16. marvellous |
| 17. pal | 18. racket |
| 19. leather | 20. license |
| 21. belt | 22. brass |
| 23. buckle | 24. hitchhiker |
| 25. unusual | 26. grin |
| 27. gently | 28. miserable |

29. flabbergasted
30. nod
31. slide
32. impressed
33. loop
34. triumphant
35. shoelace
36. sapphire
37. dangle
38. impressed
39. glance
40. ring
41. grief
42. fantastic
43. stubby
44. stuff
45. hitch
46. lap
47. palm
48. absolutely
49. superior
50. suck
51. tray
52. huffily
53. nick
54. reign
55. jeweller
56. windshield
57. undo

# APPENDIX 8

# VOCABULARY RETENTION PRODUCTIVE TEST (VRPT)

Directions: Please translate the following words into English according to the text in the program. 请根据中文意思写出英语单词（程序里出现过的）。

1. 蓝宝石 _____

2. 使大吃一惊 _____

3. 怒气冲冲地 _____

4. 笨蛋 _____

5. 骗局 _____

6. 以诈赌纸牌为生者 _____

7. 简陋的 _____

8. 短的 _____

9. 偷 _____

10. 非常小的 _____

11. 悬挂 _____

12. 哼着鼻子说 _____

# APPENDIX 9

# VOCABULARY RETENTION RECEPTIVE TEST (VRRT)

Directions: Please translate the following words into Chinese according to the text in the program.请根据程序里的课文内容把以下单词翻译成中文。

| | |
|---|---|
| 1. ratty | 2. lighter |
| 3. twerp | 4. wrist |
| 5. titchy | 6. amazing |
| 7. conjure | 8. exclaim |
| 9. snort | 10. conjuror |
| 11. irksome | 12. pearl |
| 13. sleeve | 14. rotten |
| 15. cardsharper | 16. marvellous |
| 17. pal | 18. racket |
| 19. leather | 20. license |
| 21. belt | 22. brass |
| 23. buckle | 24. hitchhiker |
| 25. unusual | 26. grin |
| 27. gently | 28. miserable |

29. flabbergasted
30. nod
31. slide
32. impressed
33. loop
34. triumphant
35. shoelace
36. sapphire
37. dangle
38. impressed
39. glance
40. ring
41. grief
42. fantastic
43. stubby
44. stuff
45. hitch
46. lap
47. palm
48. absolutely
49. superior
50. suck
51. tray
52. huffily
53. nick
54. reign
55. jeweller
56. windshield
57. undo

# APPENDIX 10

# QUESTIONNAIRE ONE问卷调查1 (Chinese version)

姓名：

性别：

年龄：

学习英语的时间（以年为单位）：

本科所学专业：

研究生所学专业：

本问卷旨在调查您对本软件的看法。每题均从下列5个选项中任选一项：

（请仔细阅读并根据自身的实际情况作出相应的选择。选项没有正误之分，我们只对您的真实情况感兴趣。谢谢合作！）

5：非常同意；4：同意；3：一般；2：不同意；1：非常不同意

| | 调查项目 | 评价等级 |
|---|---|---|
| 1 | 我喜欢在电脑上阅读英语文章。 | 5 4 3 2 1 |
| 2 | 如果电脑上安装有电子字典，我喜欢在电脑上阅读英语文章。 | 5 4 3 2 1 |
| 3 | 在电脑上阅读文章没让我觉得不适。 | 5 4 3 2 1 |
| 4 | 我熟悉一般的电脑应用。 | 5 4 3 2 1 |
| 5 | 我喜欢使用电脑上的电子字典查单词。 | 5 4 3 2 1 |

| | 调查项目 | 评价等级 |
|---|---|---|
| 6 | 我喜欢用纸质的字典查单词。 | 5 4 3 2 1 |
| 7 | 在电子字典的帮助下我可以理解一篇很难的英文文章。 | 5 4 3 2 1 |
| 8 | 使用电脑上的电子字典查单词帮助我学习这个单词。 | 5 4 3 2 1 |
| 9 | 用电子字典查单词时，我会看该词怎么发音。 | 5 4 3 2 1 |
| 10 | 看一个单词的发音帮助我记忆该词。 | 5 4 3 2 1 |
| 11 | 我会听单词的发音，如果电子字典上安装的有单词的发音的话。如果能听到单词的发音最好。 | 5 4 3 2 1 |
| 12 | 在查电子字典的时候，我想要看展示该词用法的例句。我希望看到展示单词用法的短语或句例。 | 5 4 3 2 1 |
| 13 | 查字典时，我喜欢看该词的中文解释。 | 5 4 3 2 1 |
| 14 | 查字典时，我喜欢看该词的英文解释。 | 5 4 3 2 1 |
| 15 | 查字典时，该词的中英文解释对我都有帮助，我喜欢两者都看。 | 5 4 3 2 1 |
| 16 | 为了完成正误判断题我注意了解不认识的单词的意思。 | 5 4 3 2 1 |
| 17 | 阅读文章时回答的问题帮助我学习和问题相关的生词。 | 5 4 3 2 1 |
| 18 | 词义词性搭配题帮助我学习相关的生词。 | 5 4 3 2 1 |
| 19 | 有些不认识的单词我能猜出来。 | 5 4 3 2 1 |
| 20 | 对于能猜出来的单词一般我不查字典。 | 5 4 3 2 1 |
| 21 | 对于能猜出来的单词我一般会查字典验证词义。 | 5 4 3 2 1 |
| 22 | 本程序能帮助我学习到生词。 | 5 4 3 2 1 |
| 23 | 此程序中安装的字典有助于我学习生词。 | 5 4 3 2 1 |

# QUESTIONNAIRE ONE (English version)

Name:

Gender(male/female):

Age:

Time of learning English (how many years):

Major for your bachelor degree:

Major for your M.A. degree:

This questionnaire aims to investigate your opinions towards the program. Please choose one alternative from the five items:

(Please read the following statements carefully and choose accordingly. There are no right or wrong answers since many people may have different opinions. We are interested solely in your own thoughts. Thank you very much for your cooperation.

5=strongly agree; 4=slightly agree; 3=neutral; 2=slightly disagree; 1=strongly disagree.

| | **Items** | **Ranks** |
|---|---|---|
| 1 | I like reading English articles on computer. | 5 4 3 2 1 |
| 2 | I like reading English articles on computer if an e-dictionary is equipped. | 5 4 3 2 1 |
| 3 | I feel comfortable at reading on computer. | 5 4 3 2 1 |
| 4 | I feel comfortable at using computer. | 5 4 3 2 1 |
| 5 | I like looking up words in an e-dictionary. | 5 4 3 2 1 |

| | Items | Ranks |
|---|---|---|
| 6 | I like looking up words in a printed dictionary. | 5 4 3 2 1 |
| 7 | I can understand a difficult English text with the help of an e-dictionary. | 5 4 3 2 1 |
| 8 | Looking up a word in an e-dictionary helps me learn the word. | 5 4 3 2 1 |
| 9 | I look at the phonetic symbols of a new word when looking the word up in the e-dictionary. | 5 4 3 2 1 |
| 10 | Looking at the pronunciation of a new word helps me memorize the word. | 5 4 3 2 1 |
| 11 | I want to listen to the pronunciation of the words if the function is equipped. | 5 4 3 2 1 |
| 12 | I want to read some examples of the word I look up in the e-dictionary, such as, some phrases or sentences. | 5 4 3 2 1 |
| 13 | I like to read the Chinese meaning for a word in a dictionary. | 5 4 3 2 1 |
| 14 | I like to read the English definition for a word in a dictionary. | 5 4 3 2 1 |
| 15 | I like to read both the Chinese and English definition for a word in a dictionary. | 1 2 3 4 5 |
| 16 | The idea of the coming T/F comprehension test makes me notice unknown words. | 5 4 3 2 1 |
| 17 | The question-answer RC questions help me learn the meaning of relevant words. | 5 4 3 2 1 |
| 18 | The matching task helps me learn the spelling form of these words. | 5 4 3 2 1 |

| | Items | Ranks |
|---|---|---|
| 19 | I can guess some of the unknown words from the text. | 5 4 3 2 1 |
| 20 | I don't check the meaning of the guessed words in the e-dictionary. | 5 4 3 2 1 |
| 21 | I usually check the meaning of the guessed words in the e-dictionary. | 5 4 3 2 1 |
| 22 | This program helps me learn vocabulary. | 5 4 3 2 1 |
| 23 | The e-dictionary in the program helps me learn vocabulary. | 5 4 3 2 1 |

# APPENDIX 11

# QUESTIONNAIRE TWO问卷调查2 (Chinese version)

请仔细回答以下问题。谢谢合作！

1. 一个月前使用的阅读理解程序（考试系统）是否能有效帮助你学习英语单词？为什么？
2. 该程序有何优势或不足？为什么？
3. 作为学习单词的一个工具，你是否喜欢该程序？为什么？

# QUESTIONNAIRE TWO (English version)

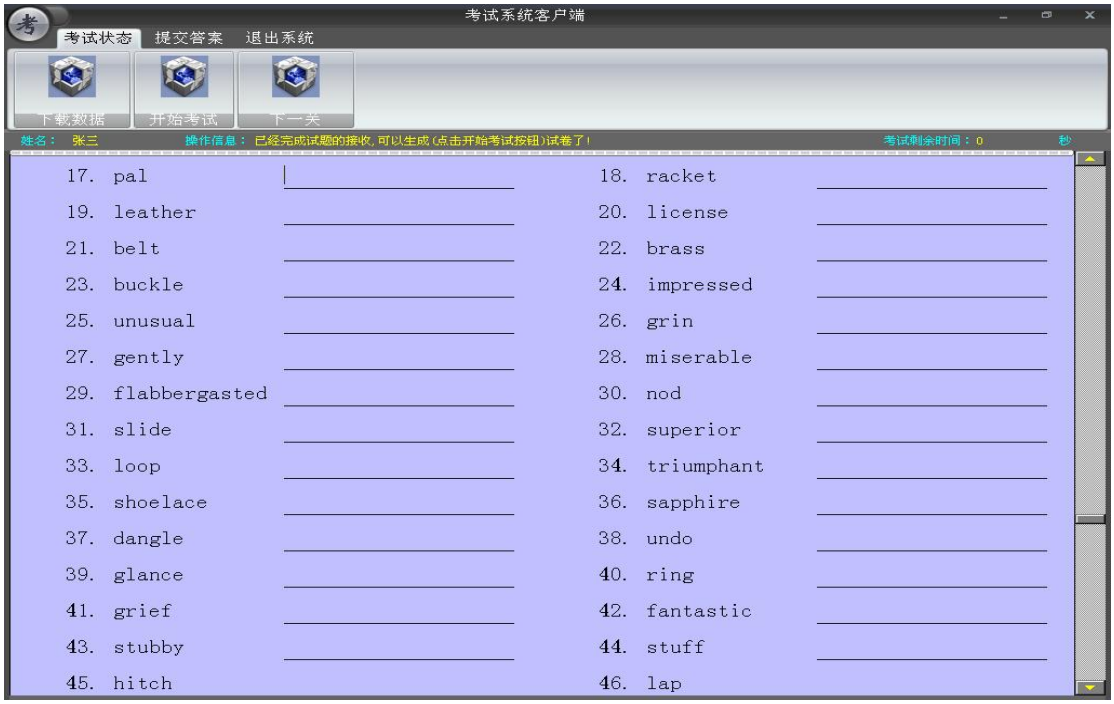
Please answer the following questions carefully. Your cooperation is highly appreciated!

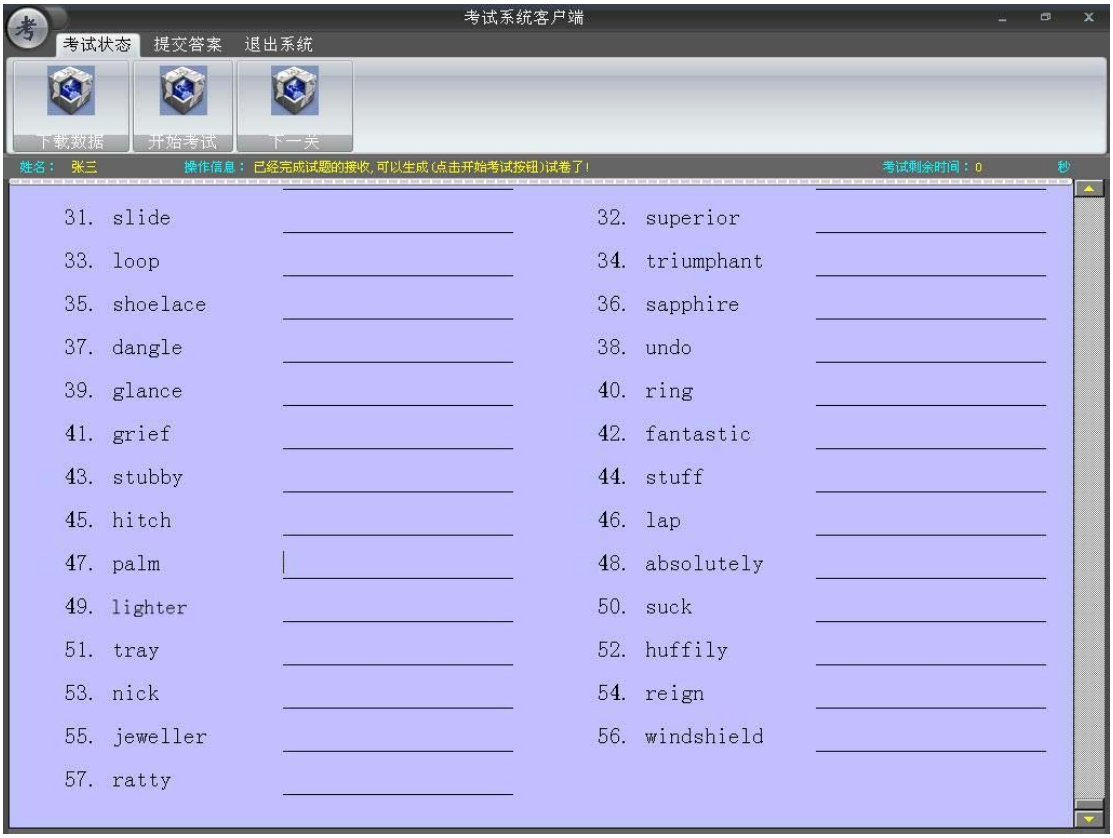
1. Do you think the reading comprehension program one month ago has helped you in learning new words? Why?
2. What are the strengths and weaknesses of the program? Why?
3. Do you like the program as a tool for learning vocabulary? Why?

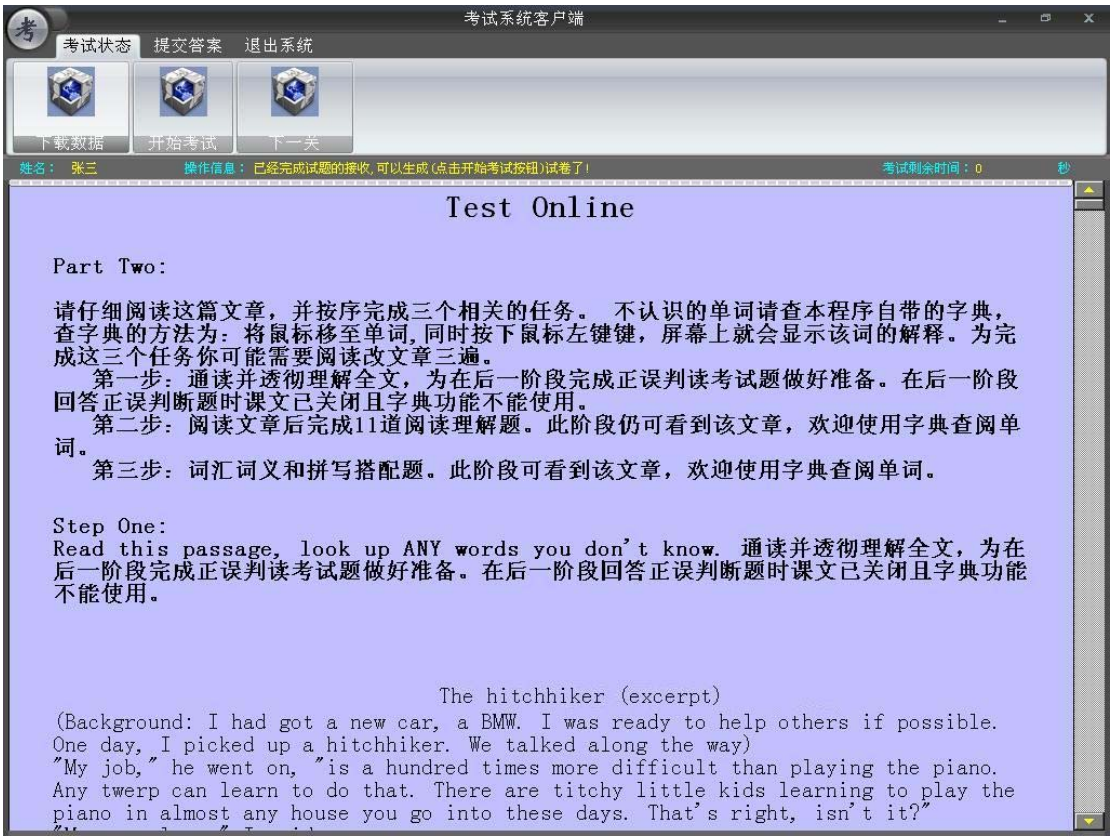
# APPENDIX 12

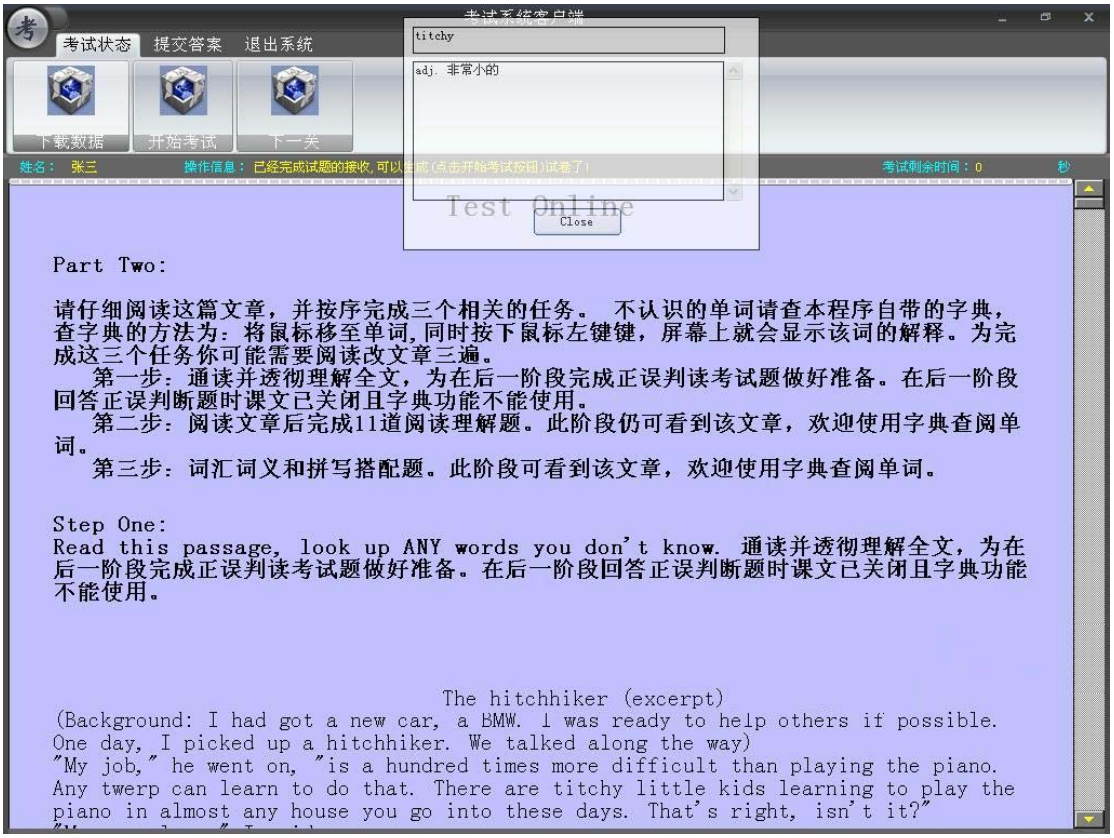
## PROCEDURES AND THE CONTENT OF THE PROGRAM

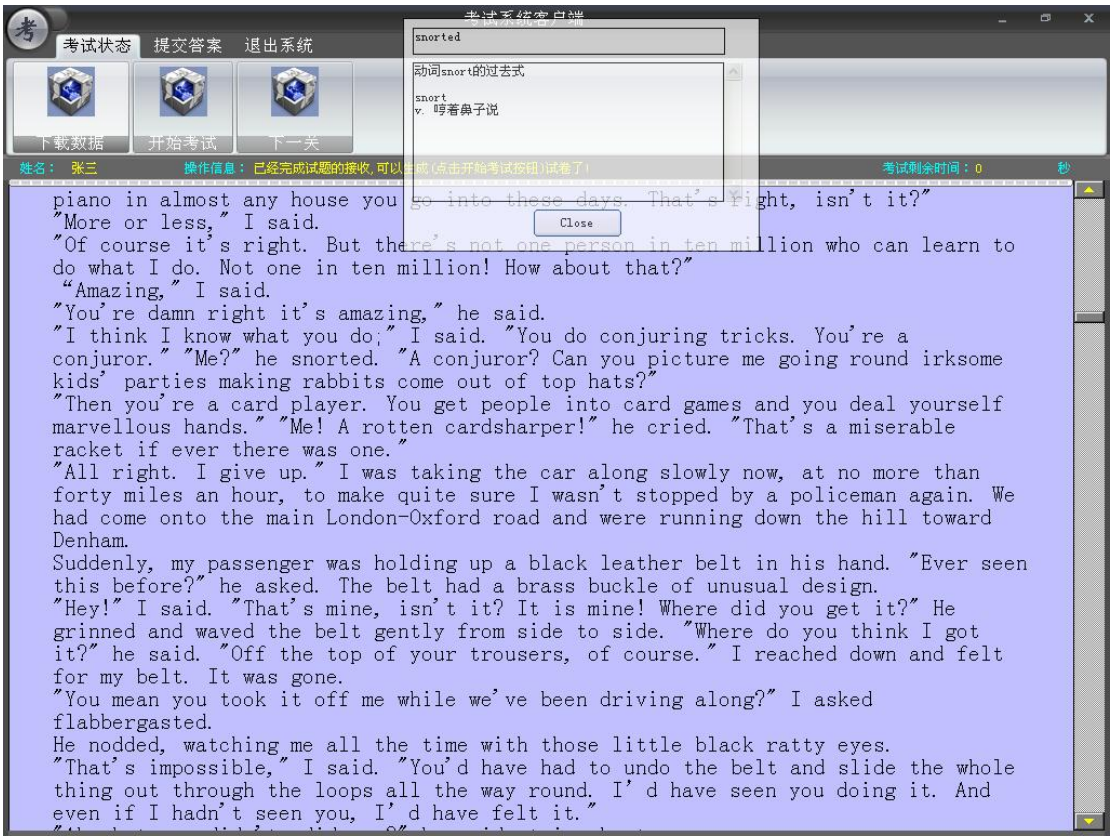
1. For the experimental group


考试系统客户端
考试状态
提交答案
退出系统
下载数据
开始考试
下一关
姓名： 张三
操作信息： 已经完成试题的接收,可以生成(点击开始考试按钮)试卷了!
考试剩余时间：0
秒
31. slide
32. superior
33. loop
34. triumphant
35. shoelace
36. sapphire
37. dangle
38. undo
39. glance
40. ring
41. grief
42. fantastic
43. stubby
44. stuff
45. hitch
46. lap
47. palm
48. absolutely
49. lighter
50. suck
51. tray
52. huffily
53. nick
54. reign
55. jeweller
56. windshield
57. ratty


考试系统客户端
考试状态
提交答案
退出系统
下载数据
开始考试
下一关
姓名： 张三
操作信息： 已经完成试题的接收,可以生成(点击开始考试按钮)试卷了!
考试剩余时间：0
秒
Test Online
Part Two:
请仔细阅读这篇文章，并按序完成三个相关的任务。 不认识的单词请查本程序自带的字典，查字典的方法为：将鼠标移至单词,同时按下鼠标左键键，屏幕上就会显示该词的解释。为完成这三个任务你可能需要阅读改文章三遍。
第一步：通读并透彻理解全文，为在后一阶段完成正误判读考试题做好准备。在后一阶段回答正误判断题时课文已关闭且字典功能不能使用。
第二步：阅读文章后完成11道阅读理解题。此阶段仍可看到该文章，欢迎使用字典查阅单词。
第三步：词汇词义和拼写搭配题。此阶段可看到该文章，欢迎使用字典查阅单词。
Step One:
Read this passage, look up ANY words you don't know. 通读并透彻理解全文，为在后一阶段完成正误判读考试题做好准备。在后一阶段回答正误判断题时课文已关闭且字典功能不能使用。
The hitchhiker (excerpt)
(Background: I had got a new car, a BMW. I was ready to help others if possible. One day, I picked up a hitchhiker. We talked along the way)
"My job," he went on, "is a hundred times more difficult than playing the piano. Any twerp can learn to do that. There are titchy little kids learning to play the piano in almost any house you go into these days. That's right, isn't it?"


考试状态
提交答案
退出系统
下载数据
开始考试
下一关
titchy
adj. 非常小的
Close
姓名： 张三
操作信息： 已经完成试题的接收,可以生成(点击开始考试按钮)试卷了!
考试剩余时间：0 秒
Test Online
Part Two:
请仔细阅读这篇文章，并按序完成三个相关的任务。 不认识的单词请查本程序自带的字典，查字典的方法为：将鼠标移至单词,同时按下鼠标左键键，屏幕上就会显示该词的解释。为完成这三个任务你可能需要阅读改文章三遍。
第一步：通读并透彻理解全文，为在后一阶段完成正误判读考试题做好准备。在后一阶段回答正误判断题时课文已关闭且字典功能不能使用。
第二步：阅读文章后完成11道阅读理解题。此阶段仍可看到该文章，欢迎使用字典查阅单词。
第三步：词汇词义和拼写搭配题。此阶段可看到该文章，欢迎使用字典查阅单词。
Step One:
Read this passage, look up ANY words you don't know. 通读并透彻理解全文，为在后一阶段完成正误判读考试题做好准备。在后一阶段回答正误判断题时课文已关闭且字典功能不能使用。
The hitchhiker (excerpt)
(Background: I had got a new car, a BMW. I was ready to help others if possible. One day, I picked up a hitchhiker. We talked along the way)
"My job," he went on, "is a hundred times more difficult than playing the piano. Any twerp can learn to do that. There are titchy little kids learning to play the piano in almost any house you go into these days. That's right, isn't it?"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snorted
动词snort的过去式
snort
v. 哼着鼻子说
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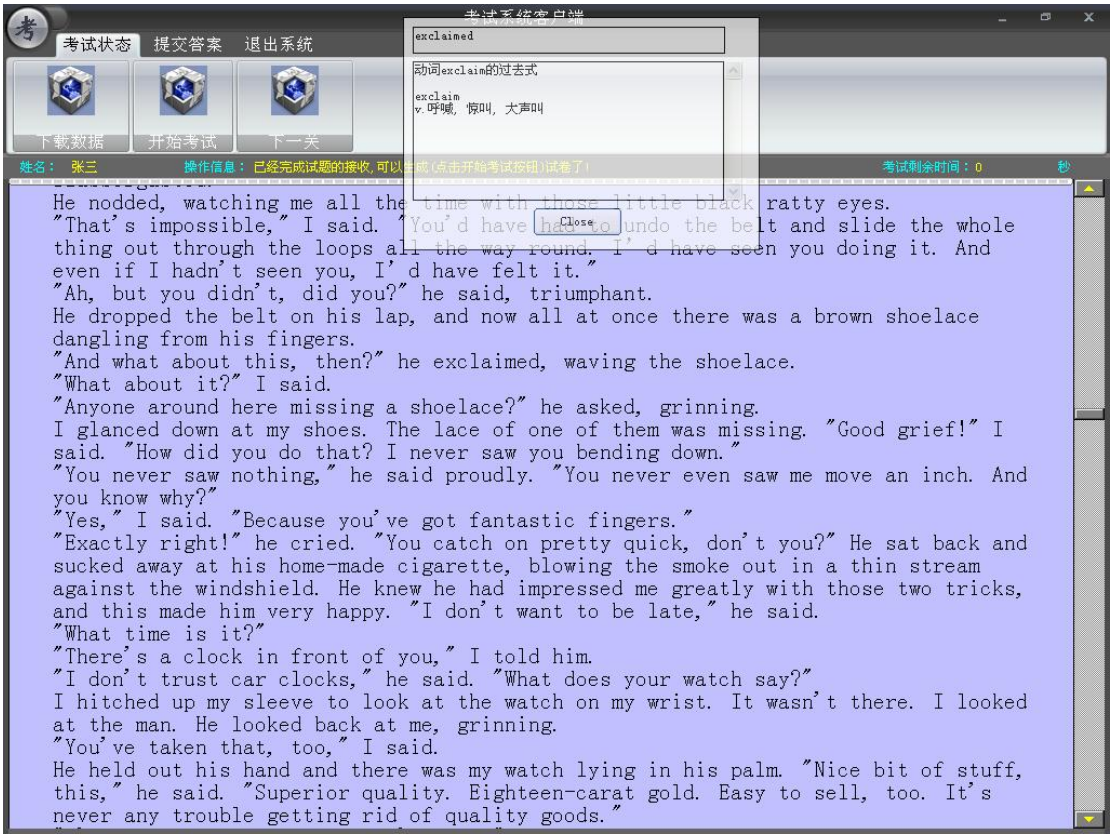
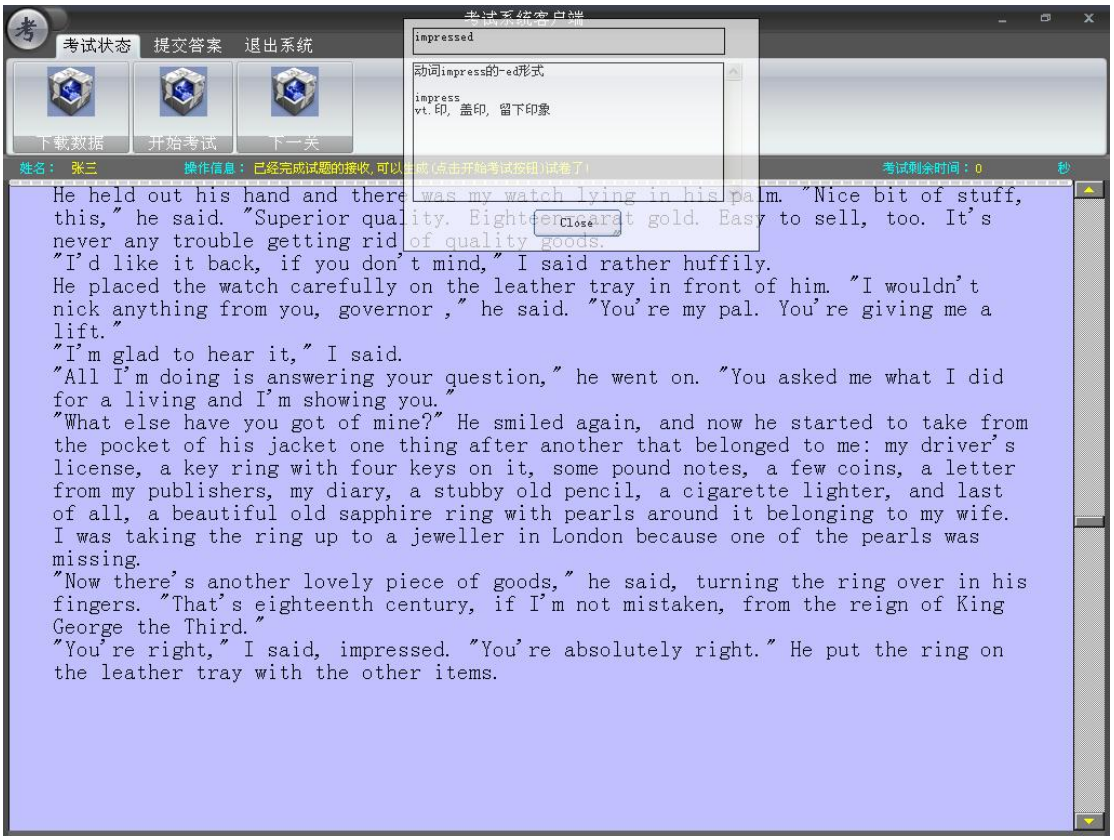
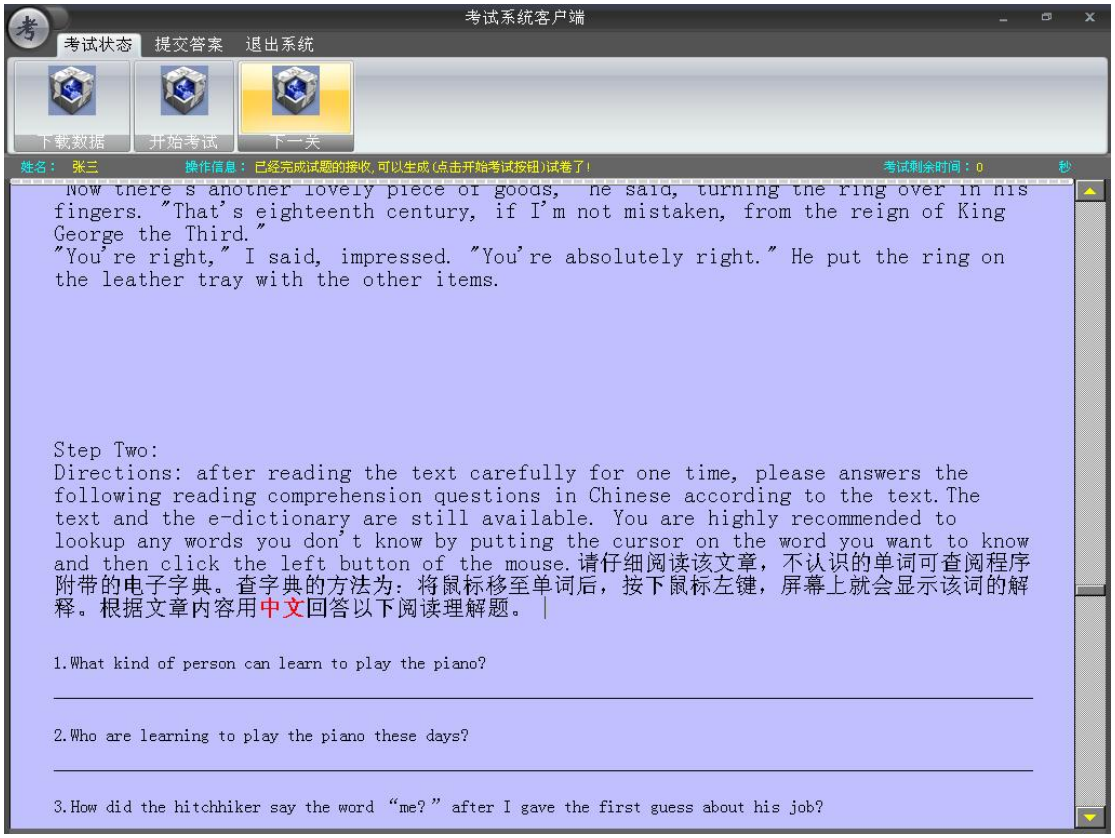
piano in almost any house you go into these days. That's right, isn't it?"
"More or less," I said.
"Of course it's right. But there's not one person in ten million who can learn to do what I do. Not one in ten million! How about that?"
"Amazing," I said.
"You're damn right it's amazing," he said.
"I think I know what you do," I said. "You do conjuring tricks. You're a conjuror." "Me?" he snorted. "A conjuror? Can you picture me going round irksome kids' parties making rabbits come out of top hats?"
"Then you're a card player. You get people into card games and you deal yourself marvellous hands." "Me! A rotten cardsharper!" he cried. "That's a miserable racket if ever there was one."
"All right. I give up." I was taking the car along slowly now, at no more than forty miles an hour, to make quite sure I wasn't stopped by a policeman again. We had come onto the main London-Oxford road and were running down the hill toward Denham.
Suddenly, my passenger was holding up a black leather belt in his hand. "Ever seen this before?" he asked. The belt had a brass buckle of unusual design.
"Hey!" I said. "That's mine, isn't it? It is mine! Where did you get it?" He grinned and waved the belt gently from side to side. "Where do you think I got it?" he said. "Off the top of your trousers, of course." I reached down and felt for my belt. It was gone.
"You mean you took it off me while we've been driving along?" I asked flabbergasted.
He nodded, watching me all the time with those little black ratty eyes.
"That's impossible," I said. "You'd have had to undo the belt and slide the whole thing out through the loops all the way round. I'd have seen you doing it. And even if I hadn't seen you, I'd have felt it."




He nodded, watching me all the time with those little black ratty eyes.
"That's impossible," I said. "You'd have had to undo the belt and slide the whole thing out through the loops all the way round. I'd have seen you doing it. And even if I hadn't seen you, I'd have felt it."
"Ah, but you didn't, did you?" he said, triumphant.
He dropped the belt on his lap, and now all at once there was a brown shoelace dangling from his fingers.
"And what about this, then?" he exclaimed, waving the shoelace.
"What about it?" I said.
"Anyone around here missing a shoelace?" he asked, grinning.
I glanced down at my shoes. The lace of one of them was missing. "Good grief!" I said. "How did you do that? I never saw you bending down."
"You never saw nothing," he said proudly. "You never even saw me move an inch. And you know why?"
"Yes," I said. "Because you've got fantastic fingers."
"Exactly right!" he cried. "You catch on pretty quick, don't you?" He sat back and sucked away at his home-made cigarette, blowing the smoke out in a thin stream against the windshield. He knew he had impressed me greatly with those two tricks, and this made him very happy. "I don't want to be late," he said.
"What time is it?"
"There's a clock in front of you," I told him.
"I don't trust car clocks," he said. "What does your watch say?"
I hitched up my sleeve to look at the watch on my wrist. It wasn't there. I looked at the man. He looked back at me, grinning.
"You've taken that, too," I said.
He held out his hand and there was my watch lying in his palm. "Nice bit of stuff, this," he said. "Superior quality. Eighteen-carat gold. Easy to sell, too. It's never any trouble getting rid of quality goods."




He held out his hand and there was my watch lying in his palm. "Nice bit of stuff, this," he said. "Superior quality. Eighteen-carat gold. Easy to sell, too. It's never any trouble getting rid of quality goods."
"I'd like it back, if you don't mind," I said rather huffily.
He placed the watch carefully on the leather tray in front of him. "I wouldn't nick anything from you, governor ," he said. "You're my pal. You're giving me a lift."
"I'm glad to hear it," I said.
"All I'm doing is answering your question," he went on. "You asked me what I did for a living and I'm showing you."
"What else have you got of mine?" He smiled again, and now he started to take from the pocket of his jacket one thing after another that belonged to me: my driver's license, a key ring with four keys on it, some pound notes, a few coins, a letter from my publishers, my diary, a stubby old pencil, a cigarette lighter, and last of all, a beautiful old sapphire ring with pearls around it belonging to my wife. I was taking the ring up to a jeweller in London because one of the pearls was missing.
"Now there's another lovely piece of goods," he said, turning the ring over in his fingers. "That's eighteenth century, if I'm not mistaken, from the reign of King George the Third."
"You're right," I said, impressed. "You're absolutely right." He put the ring on the leather tray with the other items.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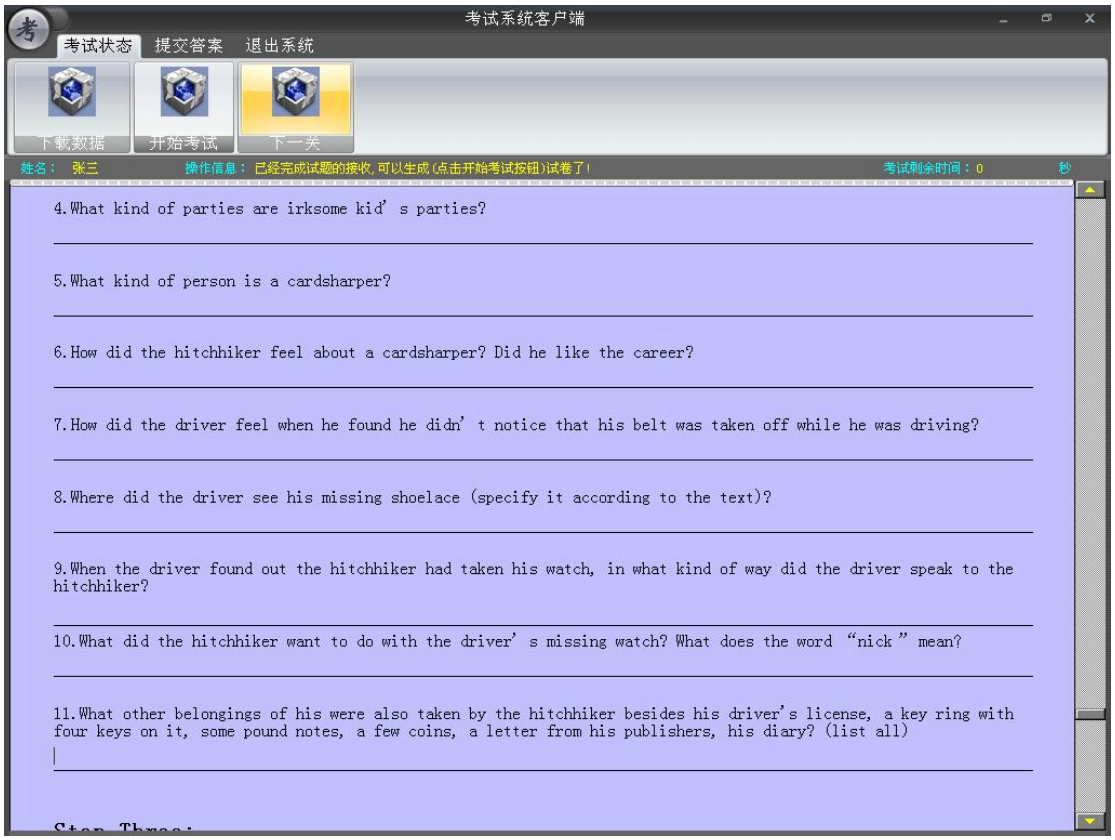
"Now there's another lovely piece of goods," he said, turning the ring over in his fingers. "That's eighteenth century, if I'm not mistaken, from the reign of King George the Third."
"You're right," I said, impressed. "You're absolutely right." He put the ring on the leather tray with the other items.
Step Two:
Directions: after reading the text carefully for one time, please answers the following reading comprehension questions in Chinese according to the text. The text and the e-dictionary are still available. You are highly recommended to lookup any words you don't know by putting the cursor on the word you want to know and then click the left button of the mouse. 请仔细阅读该文章，不认识的单词可查阅程序附带的电子字典。查字典的方法为：将鼠标移至单词后，按下鼠标左键，屏幕上就会显示该词的解释。根据文章内容用中文回答以下阅读理解题。
1. What kind of person can learn to play the piano?
2. Who are learning to play the piano these days?
3. How did the hitchhiker say the word "me?" after I gave the first guess about his job?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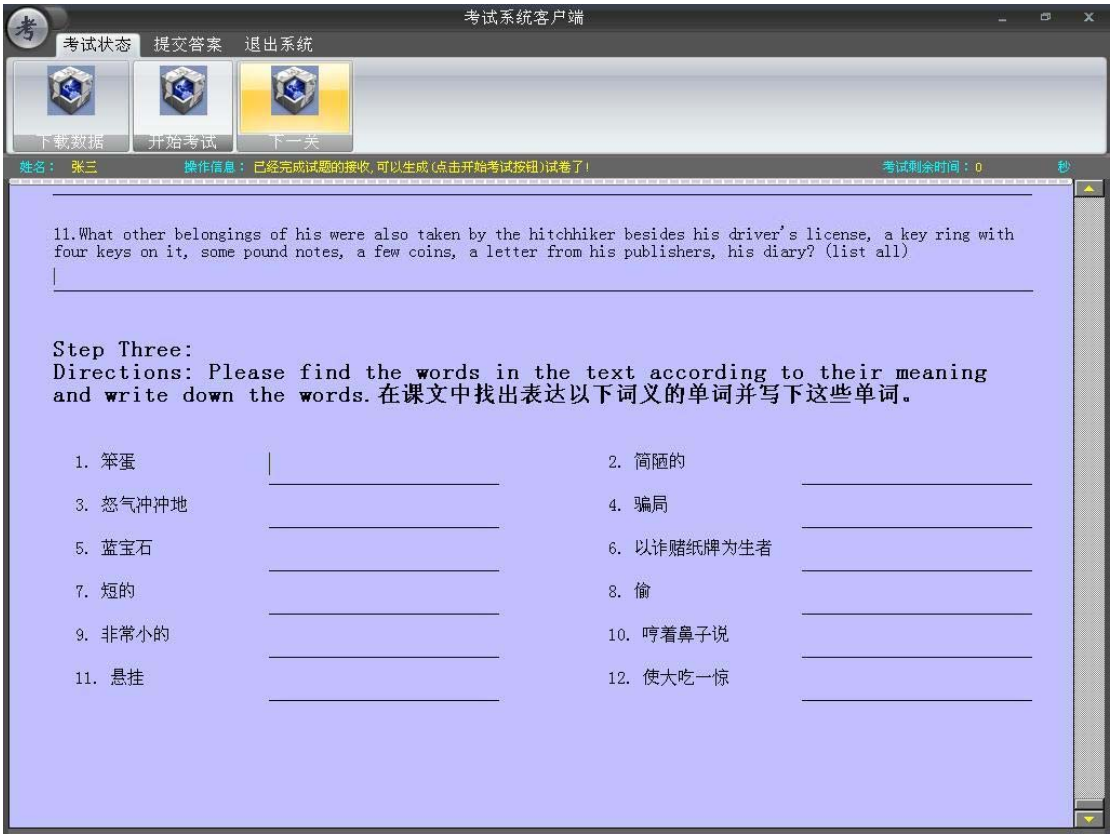
4. What kind of parties are irksome kid's parties?
5. What kind of person is a cardsharper?
6. How did the hitchhiker feel about a cardsharper? Did he like the career?
7. How did the driver feel when he found he didn't notice that his belt was taken off while he was driving?
8. Where did the driver see his missing shoelace (specify it according to the text)?
9. When the driver found out the hitchhiker had taken his watch, in what kind of way did the driver speak to the hitchhiker?
10. What did the hitchhiker want to do with the driver's missing watch? What does the word "nick" mean?
11. What other belongings of his were also taken by the hitchhiker besides his driver's license, a key ring with four keys on it, some pound notes, a few coins, a letter from his publishers, his diary? (list all)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11.What other belongings of his were also taken by the hitchhiker besides his driver's license, a key ring with four keys on it, some pound notes, a few coins, a letter from his publishers, his diary? (list all)
Step Three:
Directions: Please find the words in the text according to their meaning and write down the words.在课文中找出表达以下词义的单词并写下这些单词。
1. 笨蛋
2. 简陋的
3. 怒气冲冲地
4. 骗局
5. 蓝宝石
6. 以诈赌纸牌为生者
7. 短的
8. 偷
9. 非常小的
10. 哼着鼻子说
11. 悬挂
12. 使大吃一惊


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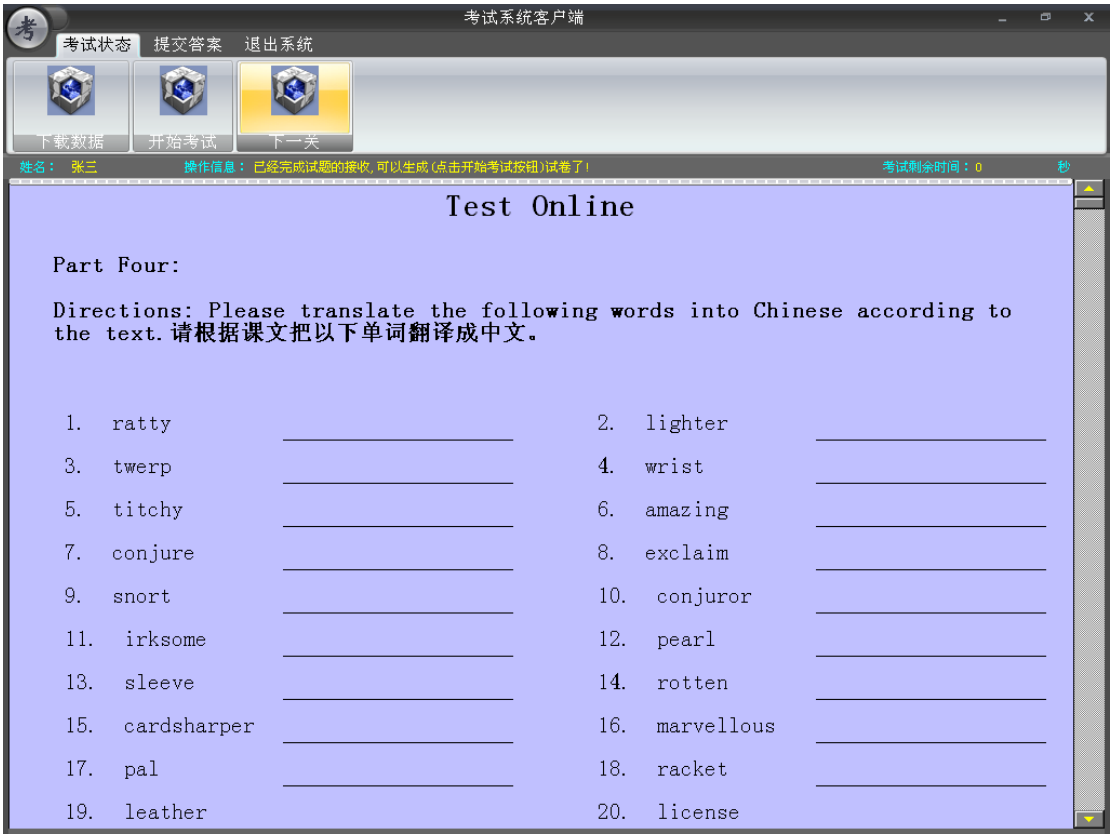
Part Three:
Directions: Please translate the following words into English according to the text.请根据课文写出与以下中文表达相对应的英语单词。
1. 骗局
2. 短的
3. 怒气冲冲地
4. 笨蛋
5. 蓝宝石
6. 以诈赌纸牌为生者
7. 非常小的
8. 使大吃一惊
9. 简陋的
10. 哼着鼻子说
11. 悬挂
12. 偷

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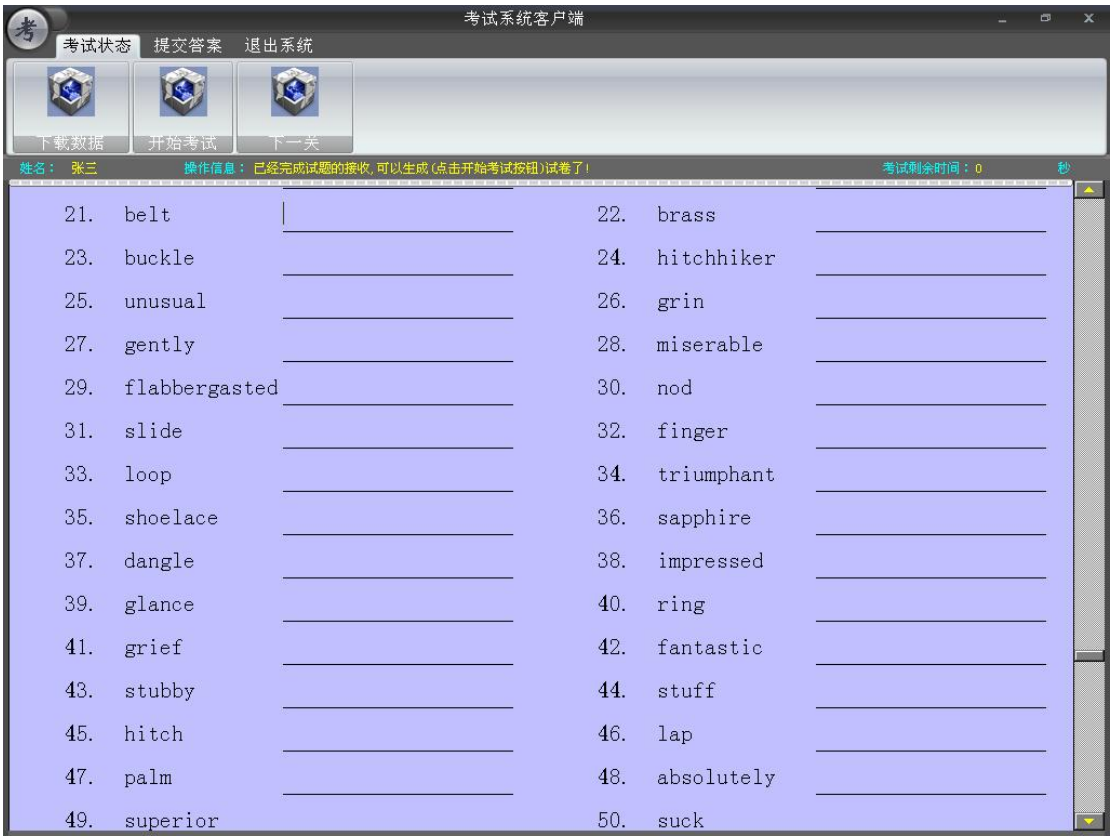
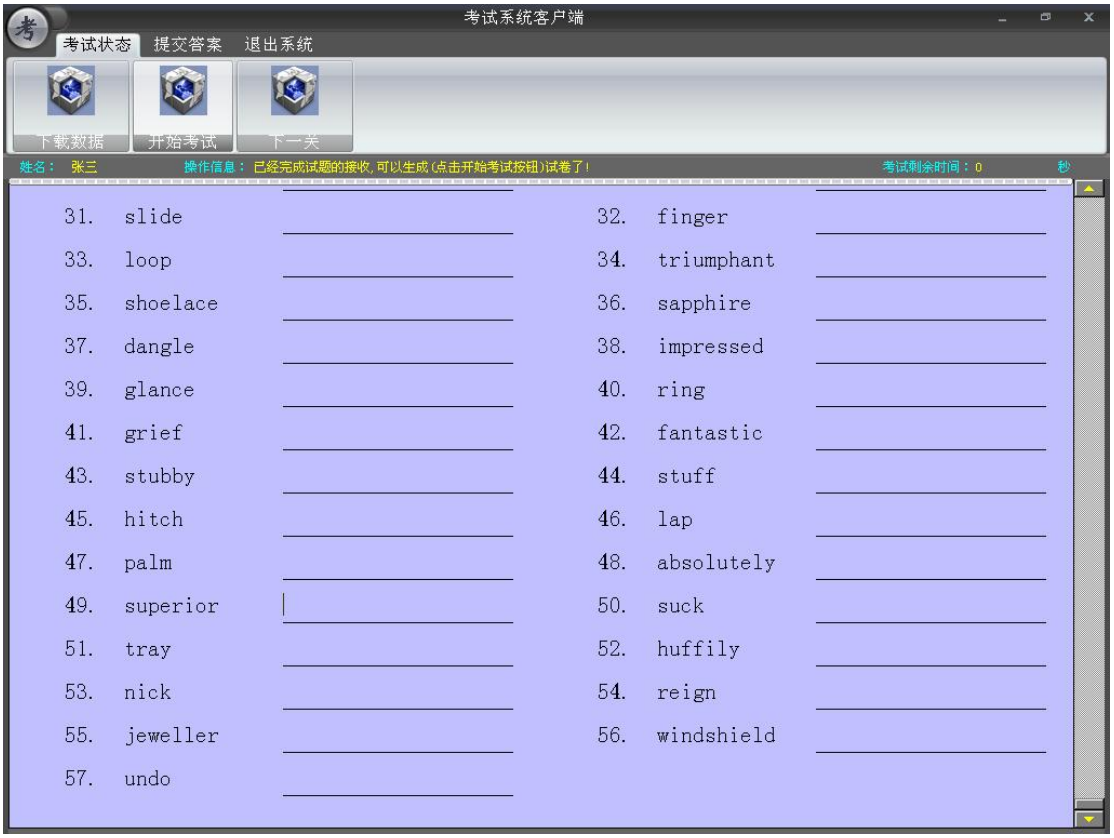
Part Four:

Directions: Please translate the following words into Chinese according to the text.请根据课文把以下单词翻译成中文。

| | | | |
|---|---|---|---|
| 1. ratty | | 2. lighter | |
| 3. twerp | | 4. wrist | |
| 5. titchy | | 6. amazing | |
| 7. conjure | | 8. exclaim | |
| 9. snort | | 10. conjuror | |
| 11. irksome | | 12. pearl | |
| 13. sleeve | | 14. rotten | |
| 15. cardsharper | | 16. marvellous | |
| 17. pal | | 18. racket | |
| 19. leather | | 20. license | |




| | | | |
|---|---|---|---|
| 21. belt | | 22. brass | |
| 23. buckle | | 24. hitchhiker | |
| 25. unusual | | 26. grin | |
| 27. gently | | 28. miserable | |
| 29. flabbergasted | | 30. nod | |
| 31. slide | | 32. finger | |
| 33. loop | | 34. triumphant | |
| 35. shoelace | | 36. sapphire | |
| 37. dangle | | 38. impressed | |
| 39. glance | | 40. ring | |
| 41. grief | | 42. fantastic | |
| 43. stubby | | 44. stuff | |
| 45. hitch | | 46. lap | |
| 47. palm | | 48. absolutely | |
| 49. superior | | 50. suck | |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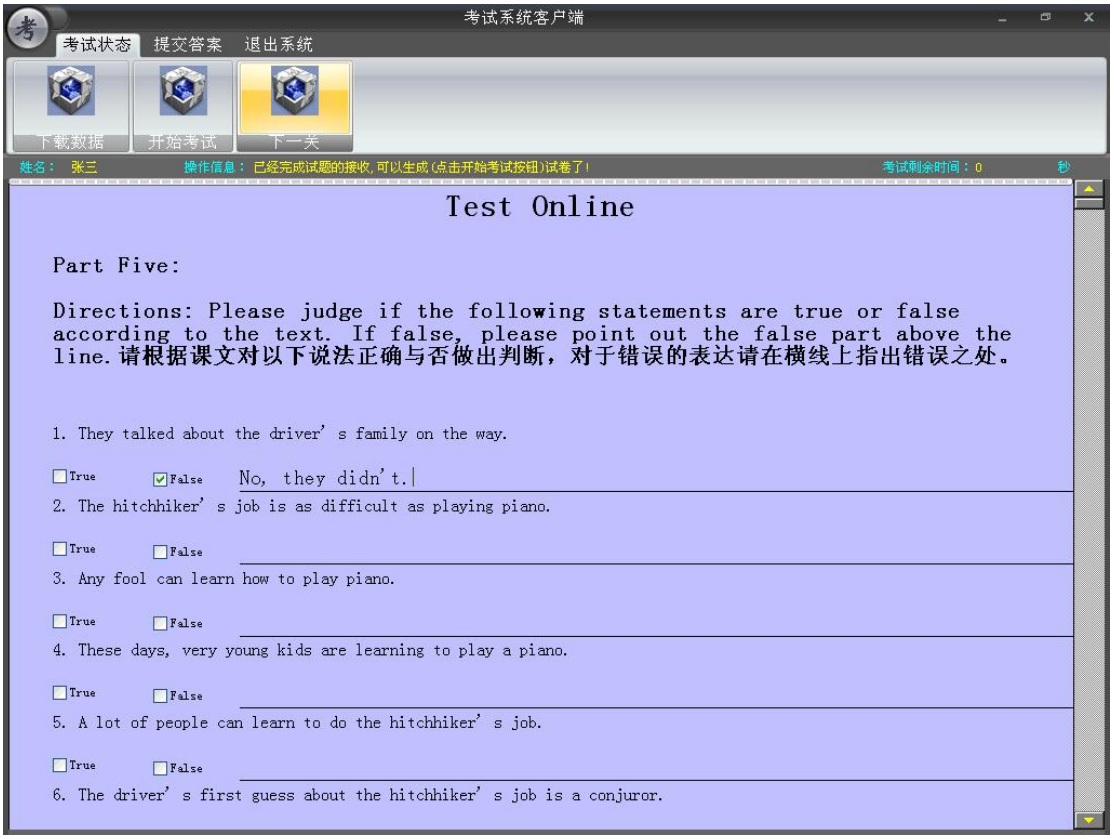
31. slide
32. finger
33. loop
34. triumphant
35. shoelace
36. sapphire
37. dangle
38. impressed
39. glance
40. ring
41. grief
42. fantastic
43. stubby
44. stuff
45. hitch
46. lap
47. palm
48. absolutely
49. superior
50. suck
51. tray
52. huffily
53. nick
54. reign
55. jeweller
56. windshield
57. undo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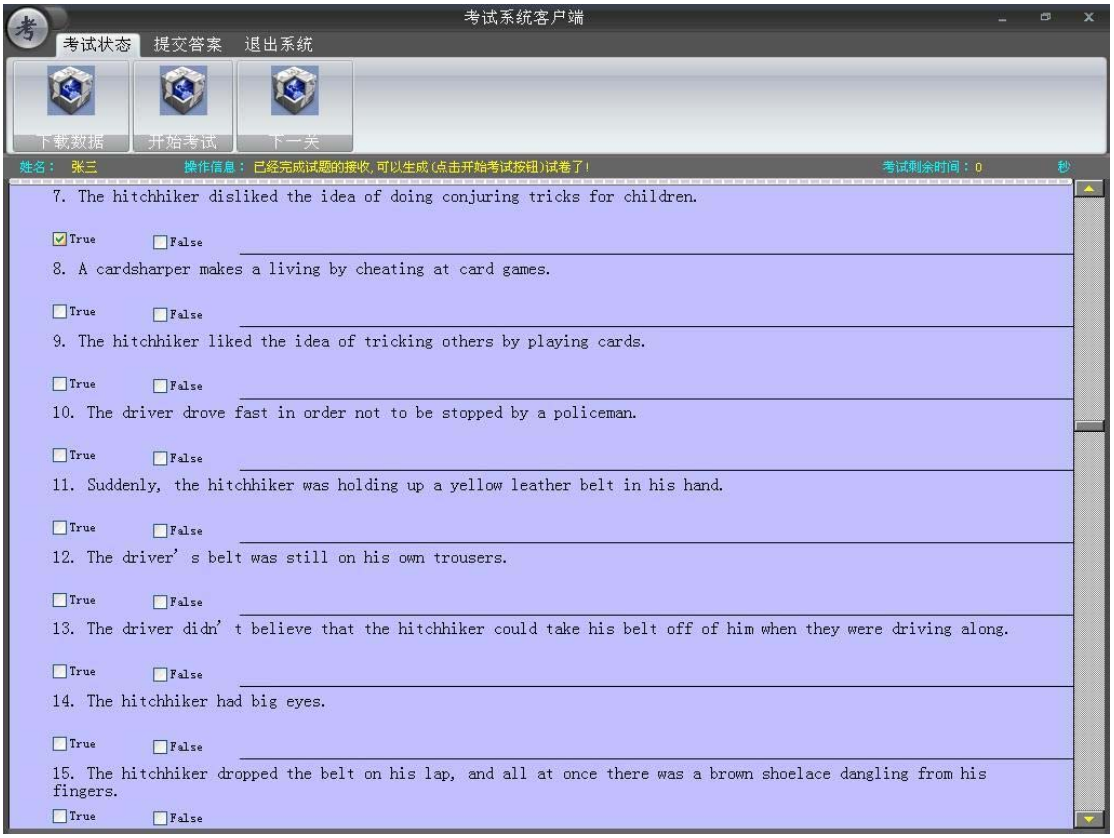
Part Five:
Directions: Please judge if the following statements are true or false according to the text. If false, please point out the false part above the line. 请根据课文对以下说法正确与否做出判断，对于错误的表达请在横线上指出错误之处。
1. They talked about the driver' s family on the way.
True
False
No, they didn't.
2. The hitchhiker' s job is as difficult as playing piano.
True
False
3. Any fool can learn how to play piano.
True
False
4. These days, very young kids are learning to play a piano.
True
False
5. A lot of people can learn to do the hitchhiker' s job.
True
False
6. The driver' s first guess about the hitchhiker' s job is a conjuror.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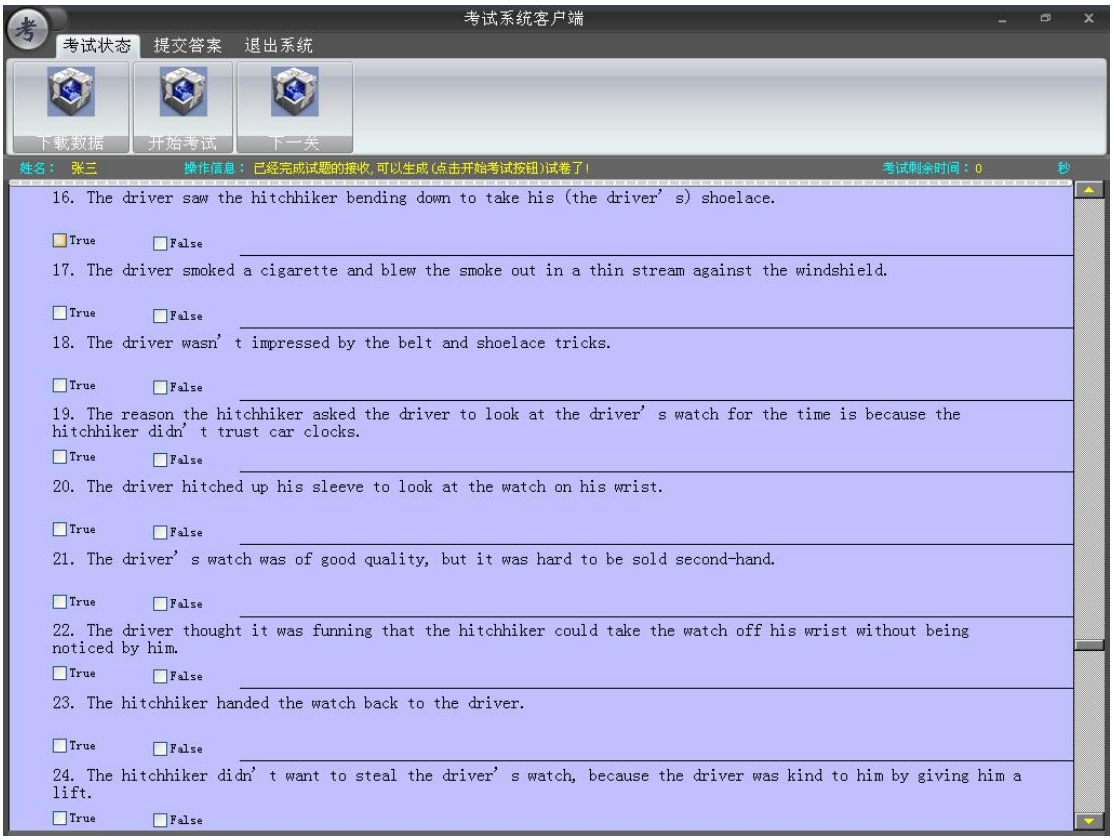
7. The hitchhiker disliked the idea of doing conjuring tricks for children.
True
False
8. A cardsharper makes a living by cheating at card games.
True
False
9. The hitchhiker liked the idea of tricking others by playing cards.
True
False
10. The driver drove fast in order not to be stopped by a policeman.
True
False
11. Suddenly, the hitchhiker was holding up a yellow leather belt in his hand.
True
False
12. The driver' s belt was still on his own trousers.
True
False
13. The driver didn' t believe that the hitchhiker could take his belt off of him when they were driving along.
True
False
14. The hitchhiker had big eyes.
True
False
15. The hitchhiker dropped the belt on his lap, and all at once there was a brown shoelace dangling from his fingers.
True
False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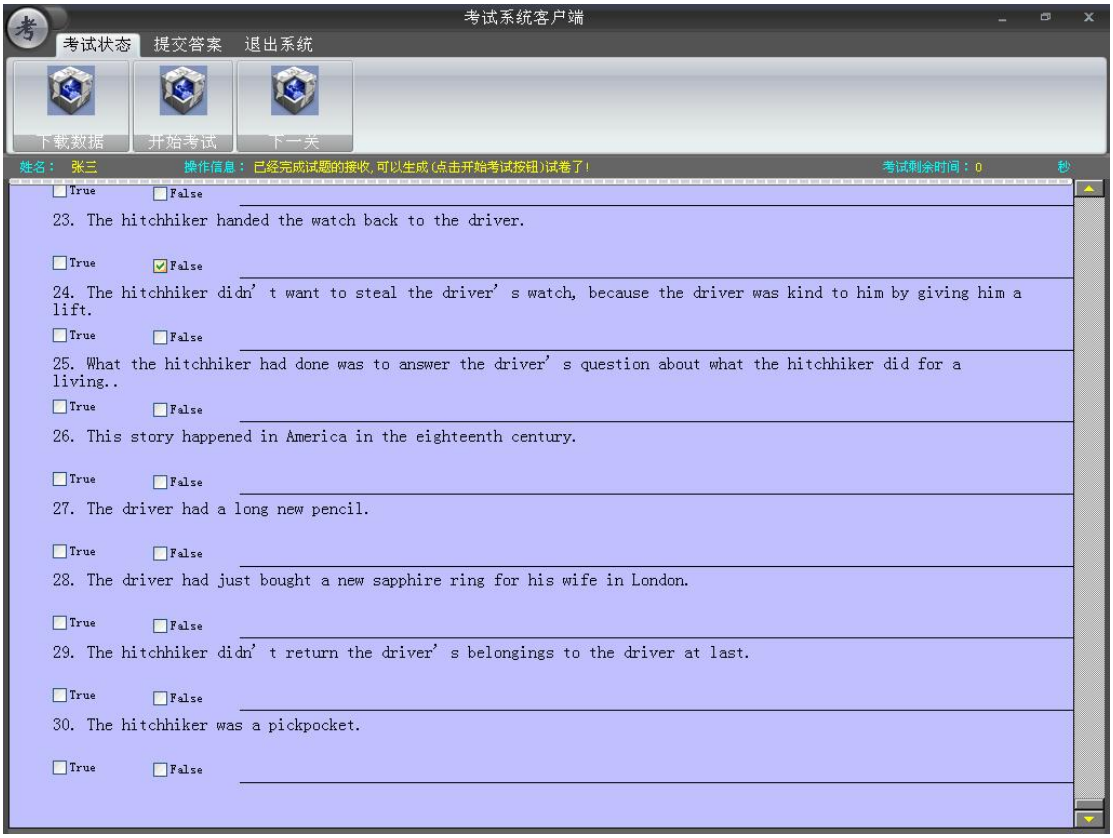
16. The driver saw the hitchhiker bending down to take his (the driver' s) shoelace.
True
False
17. The driver smoked a cigarette and blew the smoke out in a thin stream against the windshield.
True
False
18. The driver wasn' t impressed by the belt and shoelace tricks.
True
False
19. The reason the hitchhiker asked the driver to look at the driver' s watch for the time is because the hitchhiker didn' t trust car clocks.
True
False
20. The driver hitched up his sleeve to look at the watch on his wrist.
True
False
21. The driver' s watch was of good quality, but it was hard to be sold second-hand.
True
False
22. The driver thought it was funning that the hitchhiker could take the watch off his wrist without being noticed by him.
True
False
23. The hitchhiker handed the watch back to the driver.
True
False
24. The hitchhiker didn' t want to steal the driver' s watch, because the driver was kind to him by giving him a lift.
True
False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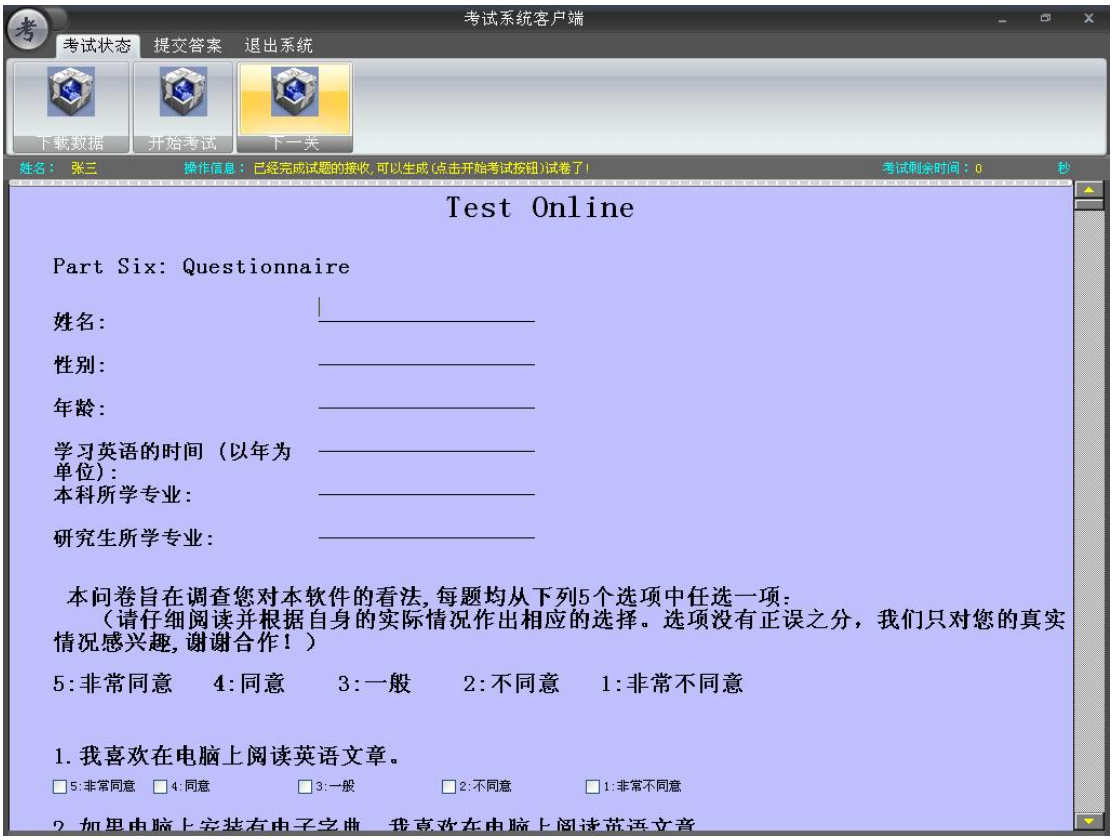
True
False
23. The hitchhiker handed the watch back to the driver.
24. The hitchhiker didn't want to steal the driver's watch, because the driver was kind to him by giving him a lift.
25. What the hitchhiker had done was to answer the driver's question about what the hitchhiker did for a living..
26. This story happened in America in the eighteenth century.
27. The driver had a long new pencil.
28. The driver had just bought a new sapphire ring for his wife in London.
29. The hitchhiker didn't return the driver's belongings to the driver at last.
30. The hitchhiker was a pickpocket.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Test Online
Part Six: Questionnaire
姓名:
性别:
年龄:
学习英语的时间（以年为单位）:
本科所学专业:
研究生所学专业:
本问卷旨在调查您对本软件的看法,每题均从下列5个选项中任选一项:
（请仔细阅读并根据自身的实际情况作出相应的选择。选项没有正误之分，我们只对您的真实情况感兴趣,谢谢合作！）
5:非常同意 4:同意 3:一般 2:不同意 1:非常不同意
1.我喜欢在电脑上阅读英语文章。
5:非常同意
4:同意
3:一般
2:不同意
1:非常不同意


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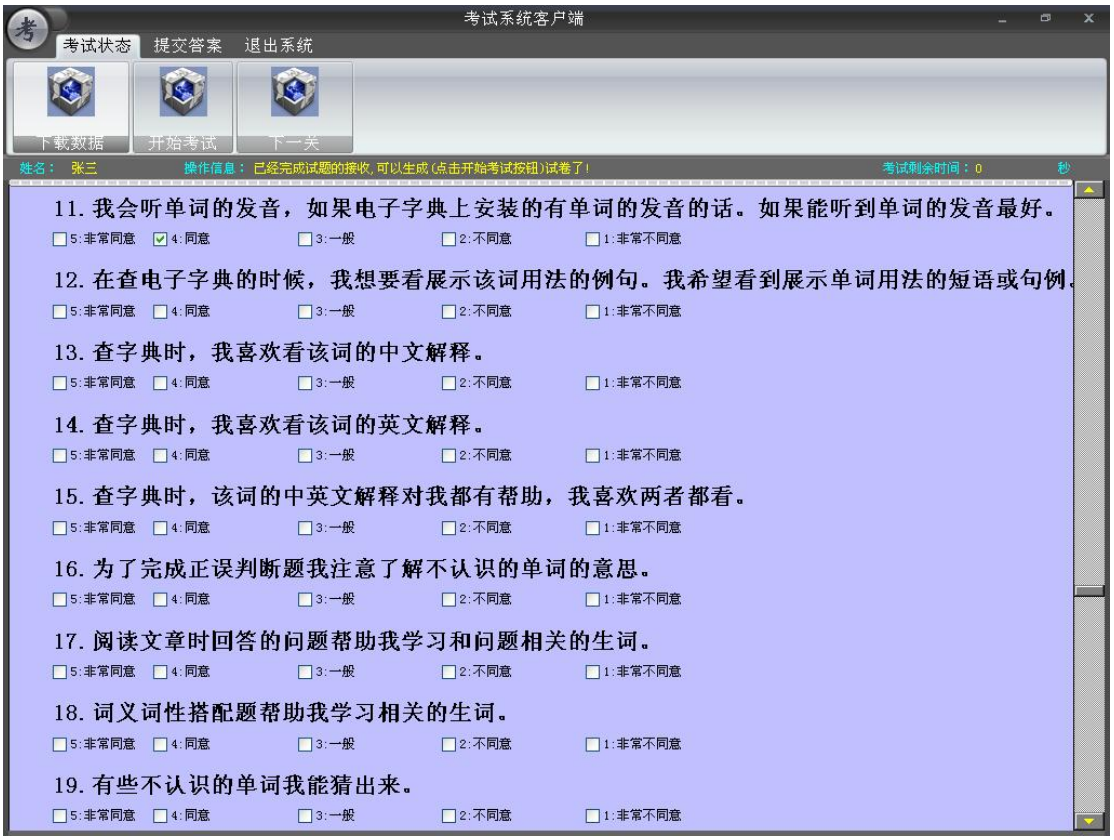
2. 如果电脑上安装有电子字典，我喜欢在电脑上阅读英语文章。
5:非常同意 4:同意 3:一般 2:不同意 1:非常不同意
3. 在电脑上阅读文章没让我觉得不适。
5:非常同意 4:同意 3:一般 2:不同意 1:非常不同意
4. 我熟悉一般的电脑应用。
5:非常同意 4:同意 3:一般 2:不同意 1:非常不同意
5. 我喜欢使用电脑上的电子字典查单词。
5:非常同意 4:同意 3:一般 2:不同意 1:非常不同意
6. 我喜欢用纸质的字典查单词。
5:非常同意 4:同意 3:一般 2:不同意 1:非常不同意
7. 在电子字典的帮助下我可以理解一篇很难的英文文章。
5:非常同意 4:同意 3:一般 2:不同意 1:非常不同意
8. 使用电脑上的电子字典查单词帮助我学习这个单词。
5:非常同意 4:同意 3:一般 2:不同意 1:非常不同意
9. 用电子字典查单词时，我会看该词怎么发音。
5:非常同意 4:同意 3:一般 2:不同意 1:非常不同意
10. 看一个单词的发音帮助我记忆该词。
5:非常同意 4:同意 3:一般 2:不同意 1:非常不同意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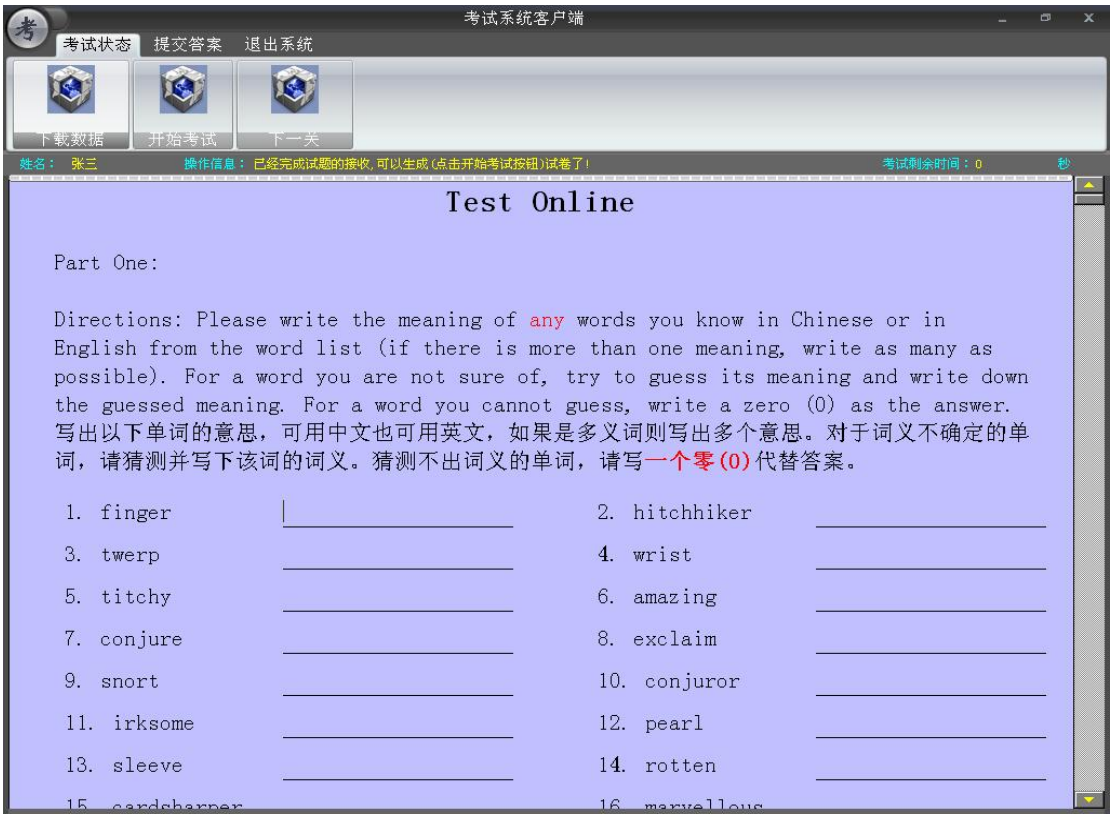
秒
11. 我会听单词的发音，如果电子字典上安装的有单词的发音的话。如果能听到单词的发音最好。
5:非常同意 4:同意 3:一般 2:不同意 1:非常不同意
12. 在查电子字典的时候，我想要看展示该词用法的例句。我希望看到展示单词用法的短语或句例。
5:非常同意 4:同意 3:一般 2:不同意 1:非常不同意
13. 查字典时，我喜欢看该词的中文解释。
5:非常同意 4:同意 3:一般 2:不同意 1:非常不同意
14. 查字典时，我喜欢看该词的英文解释。
5:非常同意 4:同意 3:一般 2:不同意 1:非常不同意
15. 查字典时，该词的中英文解释对我都有帮助，我喜欢两者都看。
5:非常同意 4:同意 3:一般 2:不同意 1:非常不同意
16. 为了完成正误判断题我注意了解不认识的单词的意思。
5:非常同意 4:同意 3:一般 2:不同意 1:非常不同意
17. 阅读文章时回答的问题帮助我学习和问题相关的生词。
5:非常同意 4:同意 3:一般 2:不同意 1:非常不同意
18. 词义词性搭配题帮助我学习相关的生词。
5:非常同意 4:同意 3:一般 2:不同意 1:非常不同意
19. 有些不认识的单词我能猜出来。
5:非常同意 4:同意 3:一般 2:不同意 1:非常不同意


2. For the control group

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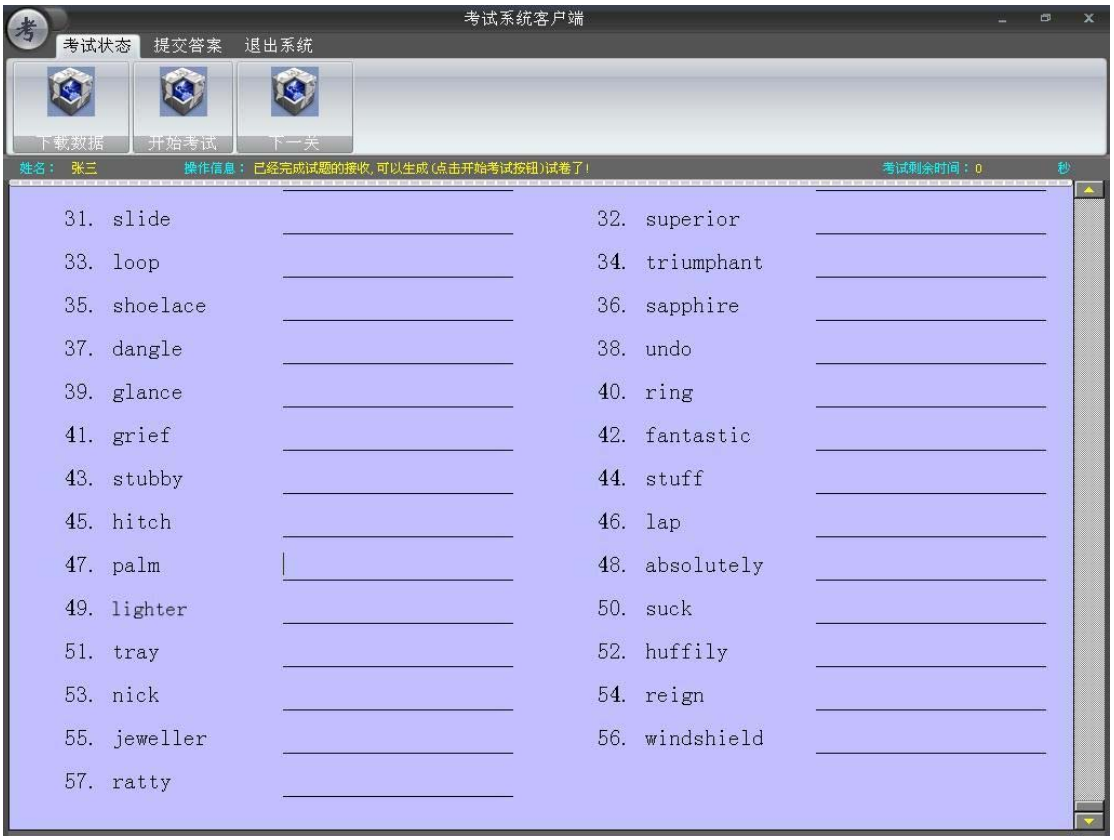
秒
17. pal
18. racket
19. leather
20. license
21. belt
22. brass
23. buckle
24. impressed
25. unusual
26. grin
27. gently
28. miserable
29. flabbergasted
30. nod
31. slide
32. superior
33. loop
34. triumphant
35. shoelace
36. sapphire
37. dangle
38. undo
39. glance
40. ring
41. grief
42. fantastic
43. stubby
44. stuff
45. hitch
46. lap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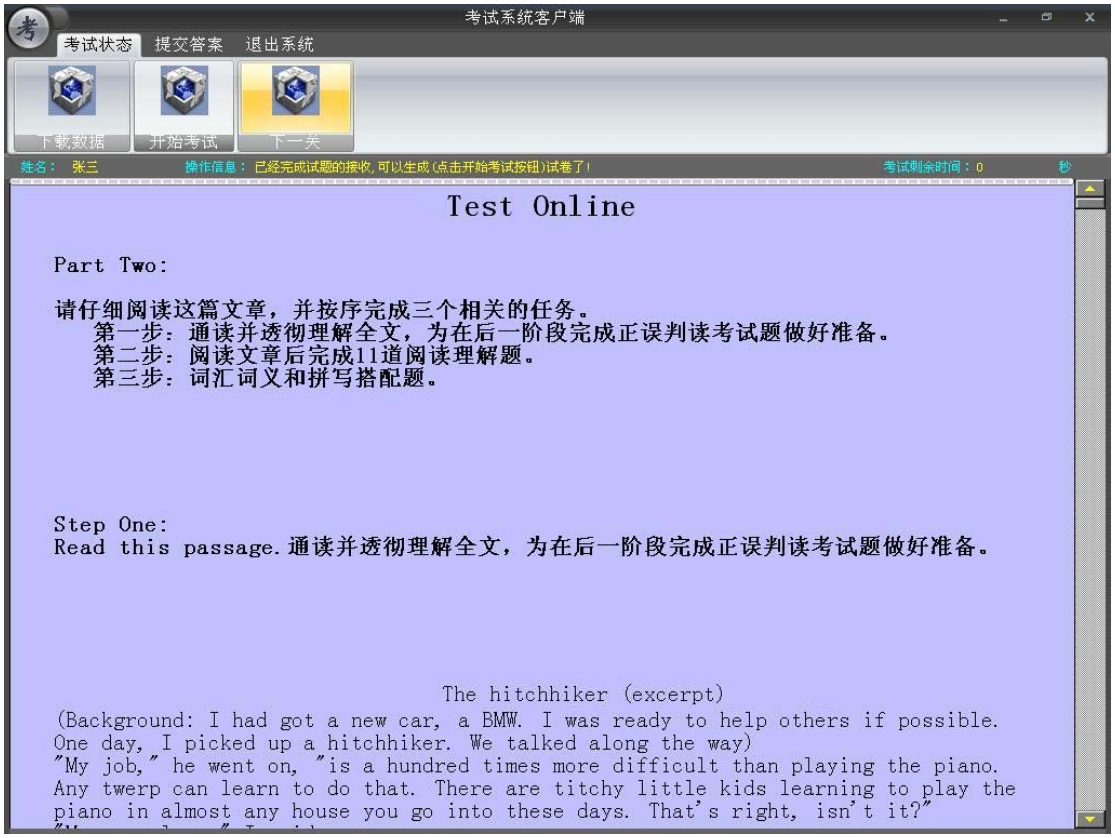
32. superior
33. loop
34. triumphant
35. shoelace
36. sapphire
37. dangle
38. undo
39. glance
40. ring
41. grief
42. fantastic
43. stubby
44. stuff
45. hitch
46. lap
47. palm
48. absolutely
49. lighter
50. suck
51. tray
52. huffily
53. nick
54. reign
55. jeweller
56. windshield
57. ratty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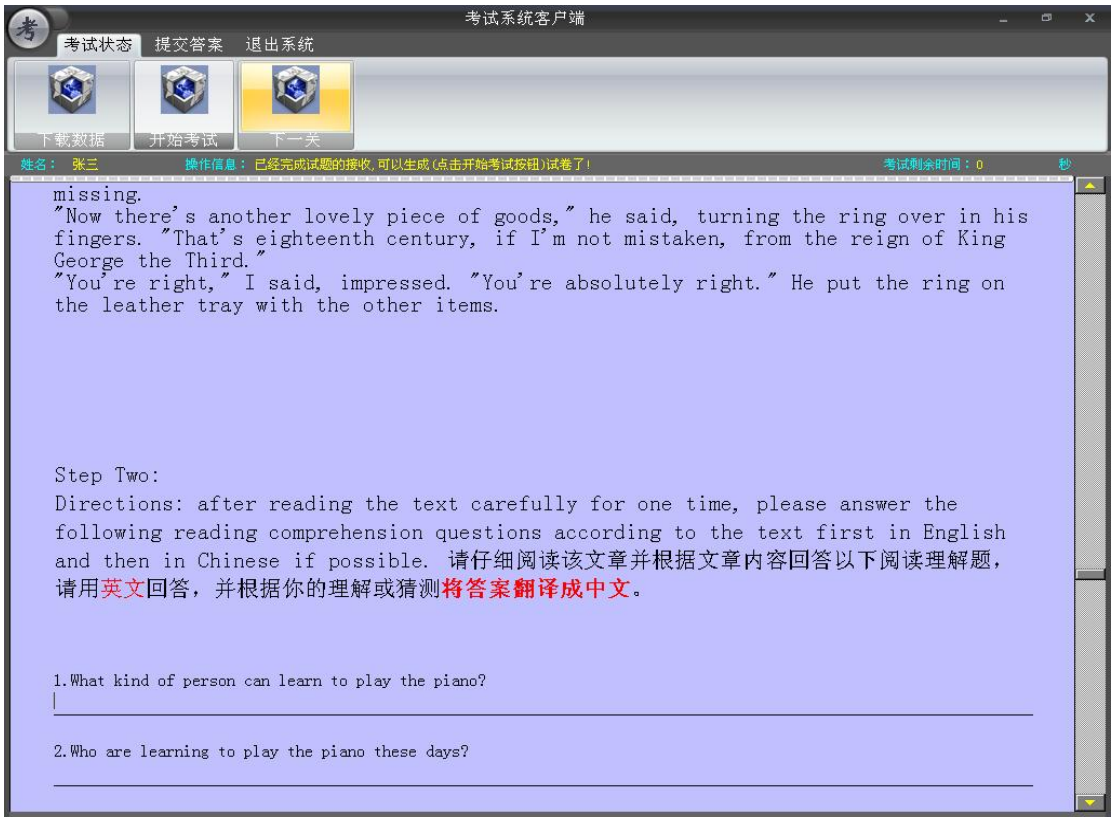
Test Online
Part Two:
请仔细阅读这篇文章，并按序完成三个相关的任务。
第一步：通读并透彻理解全文，为在后一阶段完成正误判读考试题做好准备。
第二步：阅读文章后完成11道阅读理解题。
第三步：词汇词义和拼写搭配题。
Step One:
Read this passage.通读并透彻理解全文，为在后一阶段完成正误判读考试题做好准备。
The hitchhiker (excerpt)
(Background: I had got a new car, a BMW. I was ready to help others if possible. One day, I picked up a hitchhiker. We talked along the way)
"My job," he went on, "is a hundred times more difficult than playing the piano. Any twerp can learn to do that. There are titchy little kids learning to play the piano in almost any house you go into these days. That's right, isn't it?"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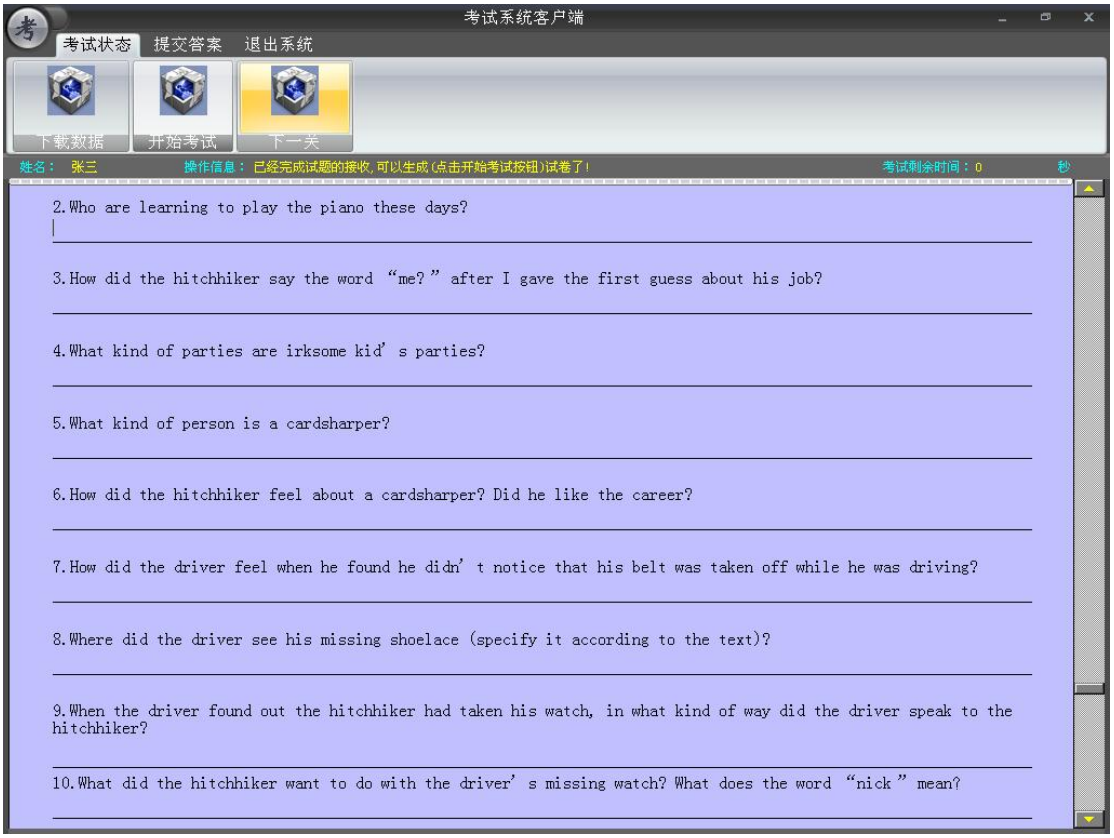
missing.
"Now there's another lovely piece of goods," he said, turning the ring over in his fingers. "That's eighteenth century, if I'm not mistaken, from the reign of King George the Third."
"You're right," I said, impressed. "You're absolutely right." He put the ring on the leather tray with the other items.
Step Two:
Directions: after reading the text carefully for one time, please answer the following reading comprehension questions according to the text first in English and then in Chinese if possible. 请仔细阅读该文章并根据文章内容回答以下阅读理解题，请用英文回答，并根据你的理解或猜测将答案翻译成中文。
1.What kind of person can learn to play the piano?
2.Who are learning to play the piano these days?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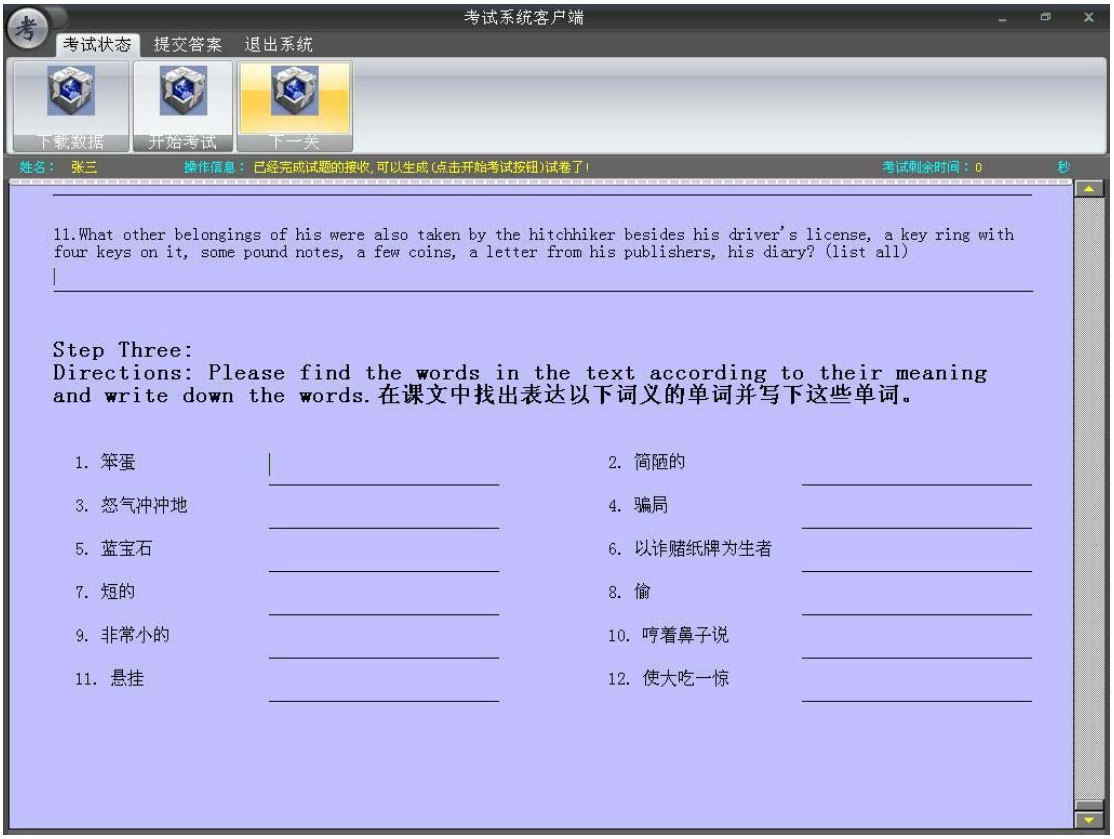
2.Who are learning to play the piano these days?
3.How did the hitchhiker say the word “me?” after I gave the first guess about his job?
4.What kind of parties are irksome kid’s parties?
5.What kind of person is a cardsharper?
6.How did the hitchhiker feel about a cardsharper? Did he like the career?
7.How did the driver feel when he found he didn’t notice that his belt was taken off while he was driving?
8.Where did the driver see his missing shoelace (specify it according to the text)?
9.When the driver found out the hitchhiker had taken his watch, in what kind of way did the driver speak to the hitchhiker?
10.What did the hitchhiker want to do with the driver’s missing watch? What does the word “nick” mean?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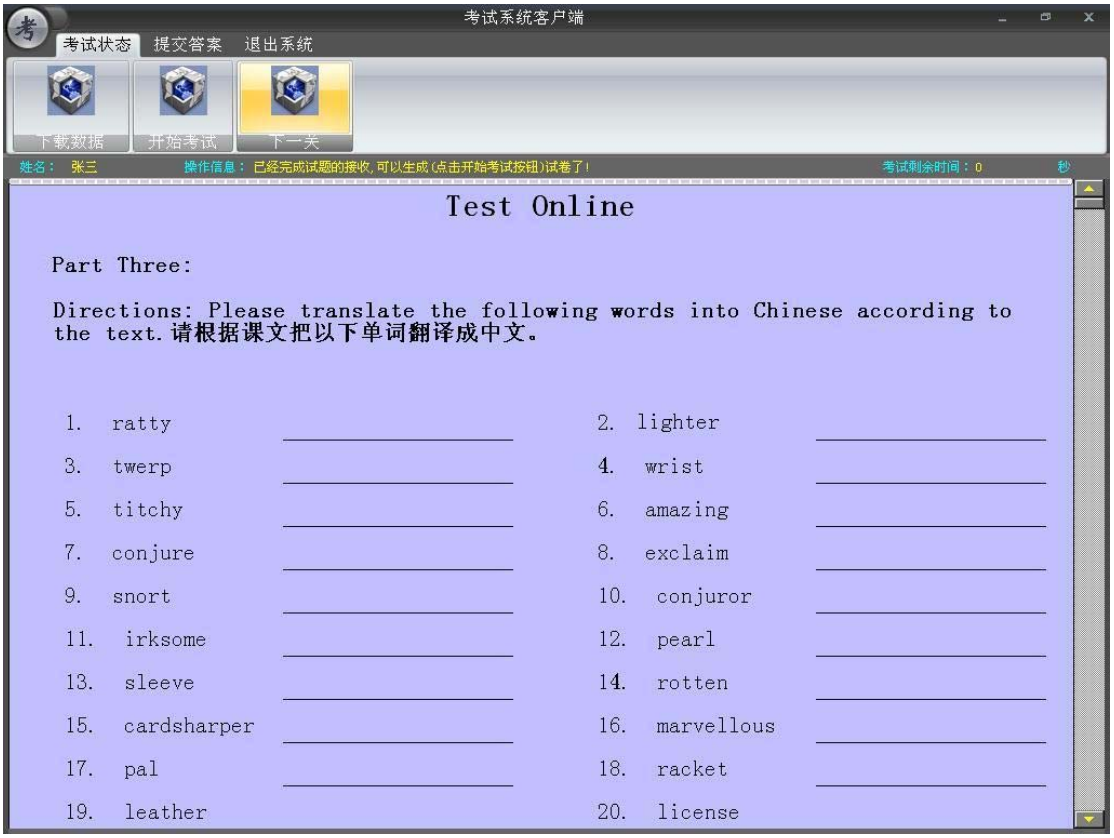
秒
11.What other belongings of his were also taken by the hitchhiker besides his driver’s license, a key ring with four keys on it, some pound notes, a few coins, a letter from his publishers, his diary? (list all)
Step Three:
Directions: Please find the words in the text according to their meaning and write down the words.在课文中找出表达以下词义的单词并写下这些单词。
1. 笨蛋
2. 简陋的
3. 怒气冲冲地
4. 骗局
5. 蓝宝石
6. 以诈赌纸牌为生者
7. 短的
8. 偷
9. 非常小的
10. 哼着鼻子说
11. 悬挂
12. 使大吃一惊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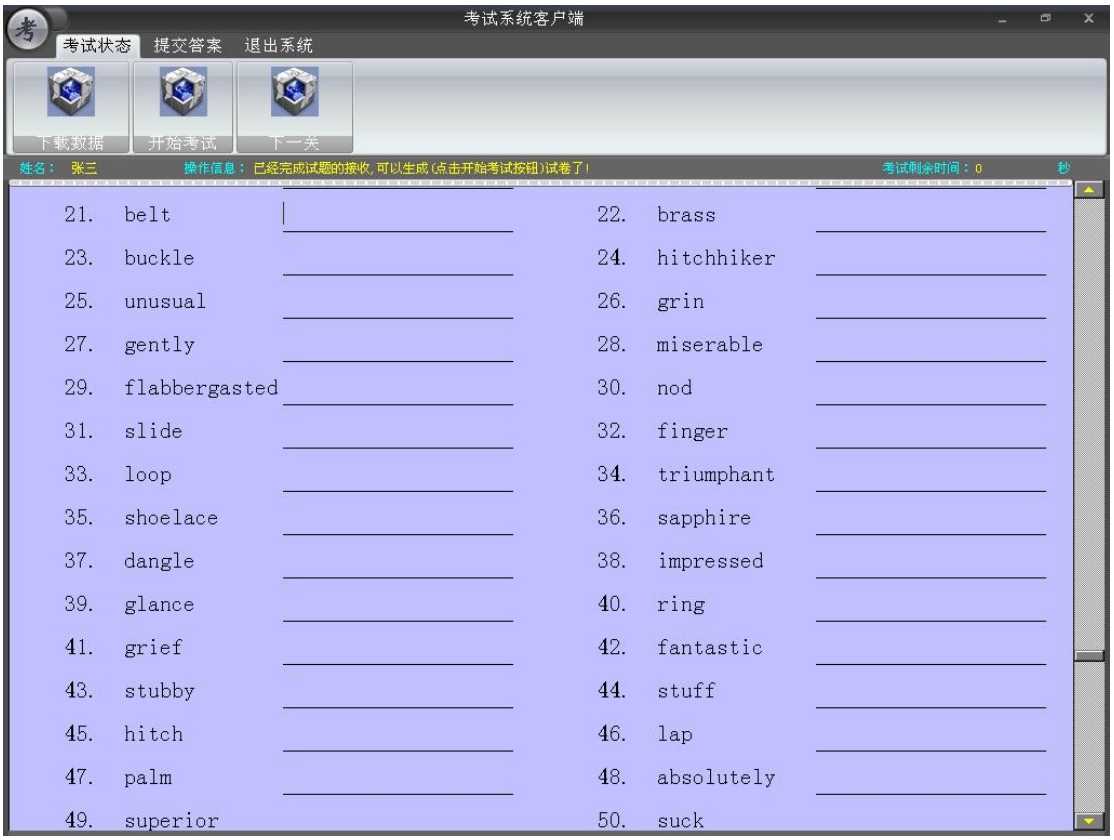
秒
Test Online
Part Three:
Directions: Please translate the following words into Chinese according to the text.请根据课文把以下单词翻译成中文。
1. ratty
2. lighter
3. twerp
4. wrist
5. titchy
6. amazing
7. conjure
8. exclaim
9. snort
10. conjuror
11. irksome
12. pearl
13. sleeve
14. rotten
15. cardsharper
16. marvellous
17. pal
18. racket
19. leather
20. license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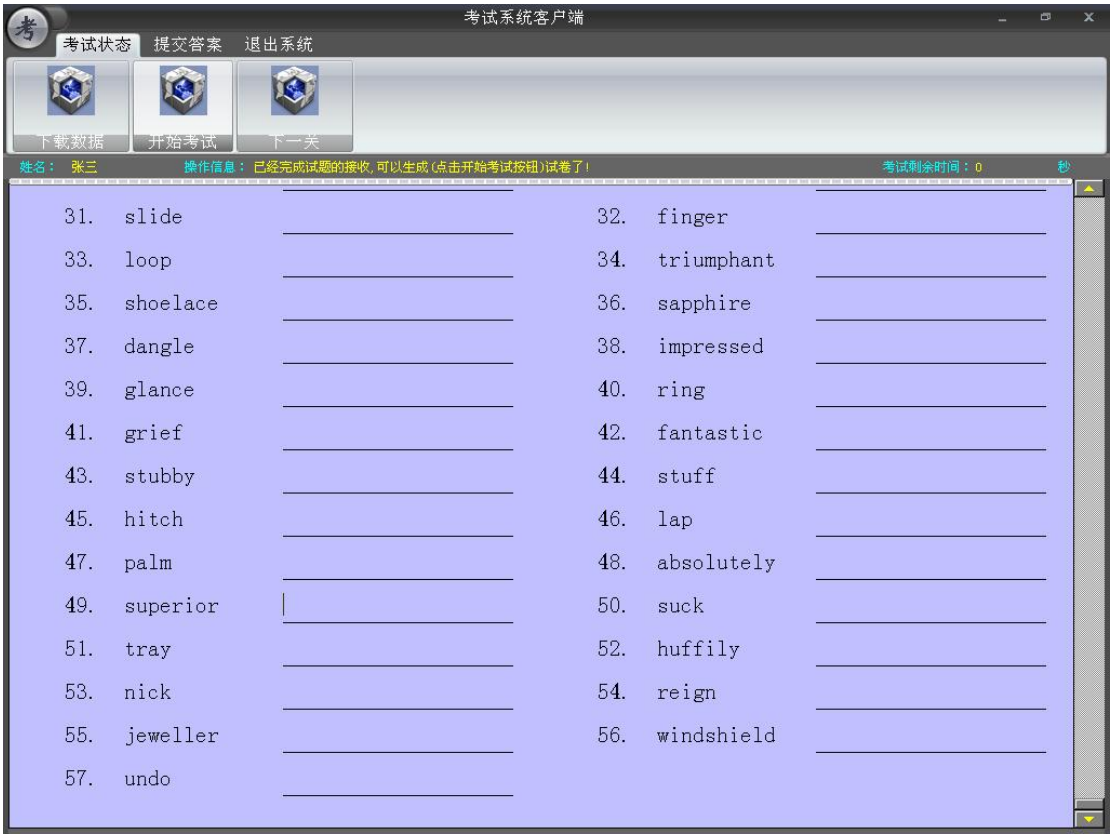
秒
21. belt
22. brass
23. buckle
24. hitchhiker
25. unusual
26. grin
27. gently
28. miserable
29. flabbergasted
30. nod
31. slide
32. finger
33. loop
34. triumphant
35. shoelace
36. sapphire
37. dangle
38. impressed
39. glance
40. ring
41. grief
42. fantastic
43. stubby
44. stuff
45. hitch
46. lap
47. palm
48. absolutely
49. superior
50. suck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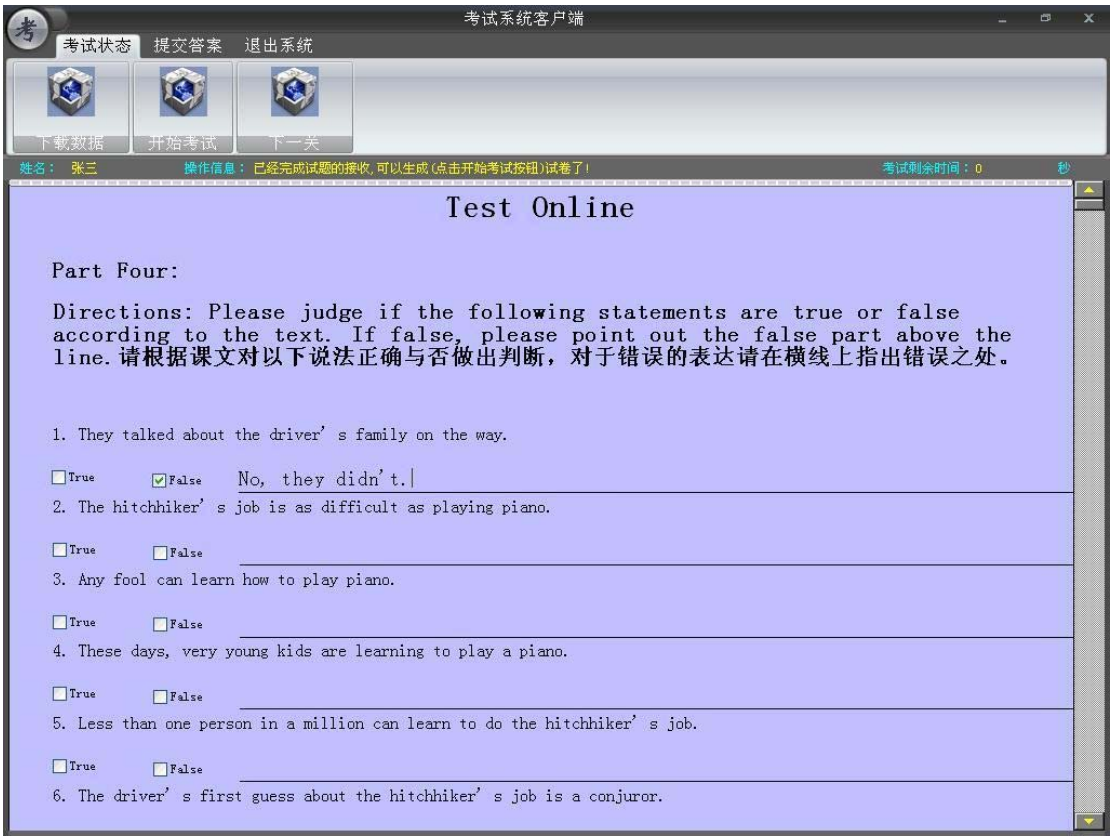
50. suck
51. tray
52. huffily
53. nick
54. reign
55. jeweller
56. windshield
57. undo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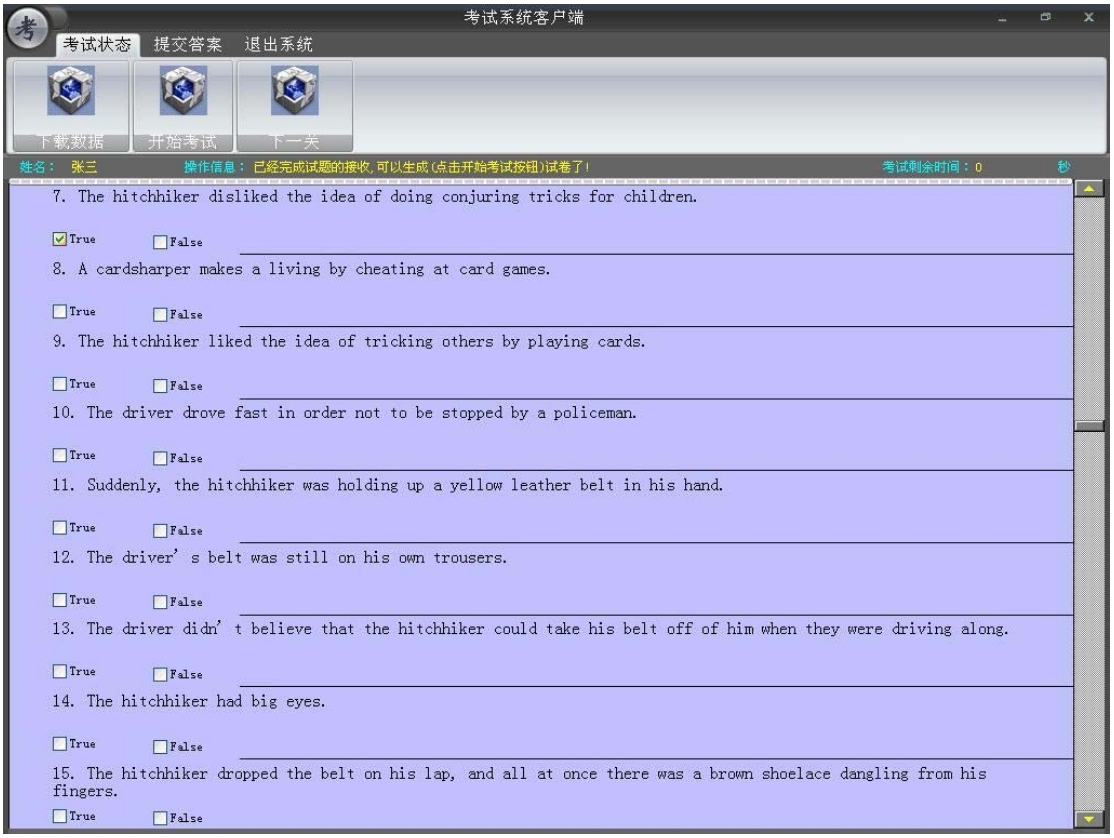
Test Online
Part Four:
Directions: Please judge if the following statements are true or false according to the text. If false, please point out the false part above the line. 请根据课文对以下说法正确与否做出判断，对于错误的表达请在横线上指出错误之处。
1. They talked about the driver's family on the way.
True
False
No, they didn't.
2. The hitchhiker's job is as difficult as playing piano.
True
False
3. Any fool can learn how to play piano.
True
False
4. These days, very young kids are learning to play a piano.
True
False
5. Less than one person in a million can learn to do the hitchhiker's job.
True
False
6. The driver's first guess about the hitchhiker's job is a conjuror.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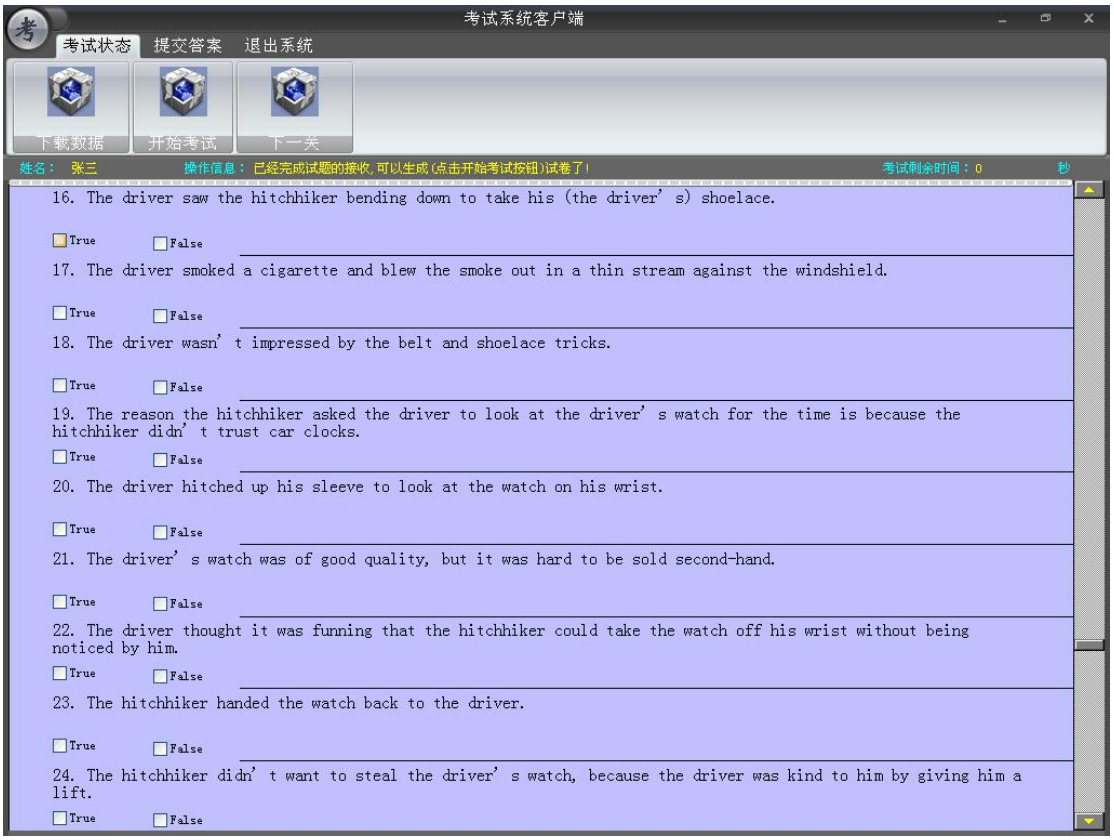
7. The hitchhiker disliked the idea of doing conjuring tricks for children.
True
False
8. A cardsharper makes a living by cheating at card games.
True
False
9. The hitchhiker liked the idea of tricking others by playing cards.
True
False
10. The driver drove fast in order not to be stopped by a policeman.
True
False
11. Suddenly, the hitchhiker was holding up a yellow leather belt in his hand.
True
False
12. The driver' s belt was still on his own trousers.
True
False
13. The driver didn' t believe that the hitchhiker could take his belt off of him when they were driving along.
True
False
14. The hitchhiker had big eyes.
True
False
15. The hitchhiker dropped the belt on his lap, and all at once there was a brown shoelace dangling from his fingers.
True
False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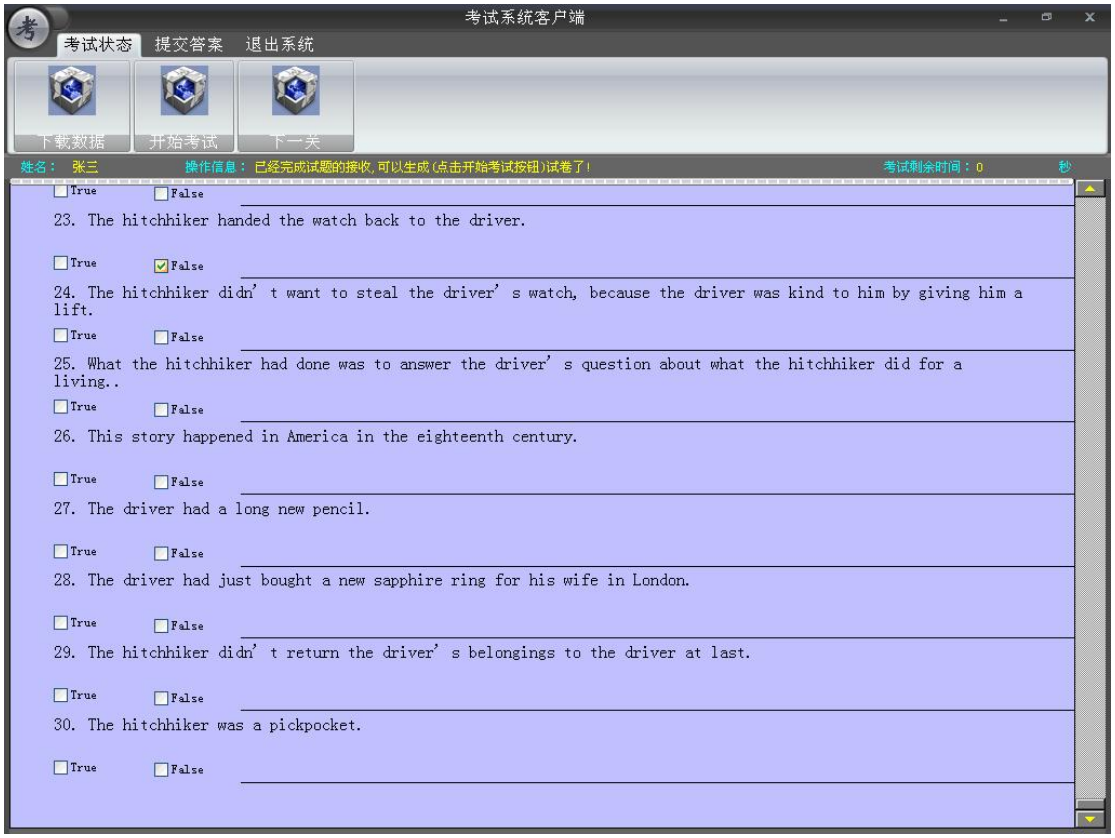
16. The driver saw the hitchhiker bending down to take his (the driver' s) shoelace.
True
False
17. The driver smoked a cigarette and blew the smoke out in a thin stream against the windshield.
True
False
18. The driver wasn' t impressed by the belt and shoelace tricks.
True
False
19. The reason the hitchhiker asked the driver to look at the driver' s watch for the time is because the hitchhiker didn' t trust car clocks.
True
False
20. The driver hitched up his sleeve to look at the watch on his wrist.
True
False
21. The driver' s watch was of good quality, but it was hard to be sold second-hand.
True
False
22. The driver thought it was funning that the hitchhiker could take the watch off his wrist without being noticed by him.
True
False
23. The hitchhiker handed the watch back to the driver.
True
False
24. The hitchhiker didn' t want to steal the driver' s watch, because the driver was kind to him by giving him a lift.
True
False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True False
23. The hitchhiker handed the watch back to the driver.
True False
24. The hitchhiker didn’ t want to steal the driver’ s watch, because the driver was kind to him by giving him a lift.
True False
25. What the hitchhiker had done was to answer the driver’ s question about what the hitchhiker did for a living..
True False
26. This story happened in America in the eighteenth century.
True False
27. The driver had a long new pencil.
True False
28. The driver had just bought a new sapphire ring for his wife in London.
True False
29. The hitchhiker didn’ t return the driver’ s belongings to the driver at last.
True False
30. The hitchhiker was a pickpocket.
True False

# CURRICULUM VITAE

Hui Cai was born on March 14th, 1975 in Weining, Guizhou Province of China. She received her Bachelor degree of Arts in English Linguistics and Literature from Foreign Languages Department, Guizhou University in 1997. In 2004, she obtained her Master of Arts degree in Linguistics and Literature from the College of International Studies, Guizhou University.

Hui Cai has been teaching English in Guizhou Finance and Economics College since 1997. She is currently an associate professor of Guizhou Finance and Economics College, China. Her academic areas of interest include vocabulary teaching, metacognition and autonomy.