Chapter XV
Electronic Strategies to Improve Chinese Reading Skills

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ABSTRACT

This chapter introduces a series of studies carried out with intermediate learners of Chinese regarding the reading of authentic e-materials with hyperlinked dictionaries. The study results indicate that it is practical to let intermediate students read authentic e-materials when aided by hyperlinked dictionaries, which can improve reading comprehension and vocabulary retention. Guided by the findings from these studies, good practices on how to use authentic e-materials and hyperlinked dictionaries to improve reading skills for intermediate students are introduced. It is recommended that in order to achieve optimal results when using technology, instructors need to employ systematic strategies to support and guide students in the reading process.

INTRODUCTION

Because Chinese sentence structures are relatively easy, mastery of vocabulary is the principal difficulty in reading Chinese. In Modern Chinese texts, there are boundaries for characters, but no boundaries for words that may be composed of a variable number of characters. In the reading process, Chinese as a foreign language (CFL) learners need to recognize characters, combine them into words, and recognize the meaning of words.

The bottleneck for intermediate CFL learners to read authentic materials lies in their lack of vocabulary. Intermediate learners in this chapter are defined according to the general division in the U.S.—intermediate low students are those who have mastered the basic grammatical patterns and several hundred core vocabulary items, while intermediate high students are those who are nearly ready to tackle authentic materials. One popular textbook series, *Integrated Chinese* (Yao et al., 2005), leads students through the entry level over two level-one books. After finishing the level-one

books, students are ready to take intermediate courses, and they have learned basic sentence structures, a little more than 700 characters, and less than 2,000 words.

In Chinese, knowledge of the 1,500 most frequently used characters constitutes the threshold of literacy. According to the frequency list of modern Chinese (Language Teaching Research Section of the Beijing Language Institute, 1986), the first 1,500 characters in the list covered approximately 96% of all the characters in the corpus texts from which the frequency list was generated. In terms of words, the 4,000 most frequently used words in the list covered approximately 90% of the corpus texts. Liu (2000) points out that around 5,000 words are needed to read general articles in newspapers and to understand general broadcast news. To summarize, the 1,500 most frequently used characters and 4,000-5,000 words are needed to read general authentic materials. Hence, there exists a large vocabulary gap between what intermediate (especially intermediate low) students know and what is required for reading authentic materials.

Can we use authentic materials to improve reading skills for intermediate students? At the intermediate level, CFL students have already learned the basic sentence structures of the language. Moreover, generally speaking, CFL learners are proficient readers in L1 (first language), which is conducive to their reading in L2 (second language), Chinese in this case. As indicated by Nuttall (1996), "There is a strong transfer of reading habits from one language to another" (p. 58). Bernhardt (2003) indicates 20% of L2 reading can be explained from L1 literacy. Nevertheless, there is still a great vocabulary hurdle for intermediate students to surmount in order to read authentic materials. Nuttall (1996) thinks that 2-3% of new words in extensive reading texts is a high concentration of new vocabulary. If we use this criterion, intermediate CFL learners have too large a vocabulary gap to close in order to read authentic materials. A paper dictionary cannot effectively aid them, as it is very time consuming to look up a word in a dictionary. Hence, it is difficult for immediate students to use a paper dictionary to tackle authentic materials that are not yet within their reach.

We can resort to computer technology to help intermediate students read authentic electronic materials (e-materials), because in an "optimal instructional environment," "technology is an integral part of a successful foreign-language curriculum" (Bai, 2003, p. 1). Martinez-Lage (1997) points out that "the use of interactive hypermedia technology in the teaching of reading…brings a number of unquestionable benefits to both instructors and students" (p. 149). This chapter explores the use of authentic e-materials and hyperlinked dictionaries to develop reading skills for intermediate students.

LITERATURE REVIEW

Literature review is done to explore the uniqueness of the Chinese language, the differences between reading printed and e-materials, the advantages of using authentic materials, the features of hyperlinked dictionaries, and the existing literature on the effects of hyperlinked dictionaries on reading comprehension.

The Prominence of Understanding the Meaning of Characters and Words

Characters are the building blocks of written Chinese. As summarized by Xu (2001), the basic language unit in Chinese is the character, not the word—in fact, linguists cannot give a precise definition of the Chinese word. Holding the same view, Lü (2006) also advocates the idea that characters are combined into words and phrases, and words and phrases are further expanded to sentences in actual use. Because of the central position of characters in the written language,

understanding their meaning is essential to the reading process.

The meaning of words is related with the meanings of composite characters. In modern Chinese, the majority of words are composed of one or two characters (Language Teaching Research Section of the Beijing Language Institute, 1986), while two-character ones are the most common (Chen, Yu, & Zhao, 2005; Liu, 2000). Two characters are combined into words in different structures: subject-predicate, modifying, verb-complement, parallel, verb-object, and so forth (Chen, Yu, & Zhao, 2005; Fu, 2004; Liu, 2000). The meaning of a two-character word is related to the meanings of the two individual characters and the combination structures, though the word's meaning is not simply the sum total of the meanings of the two composite characters.

In the reading process, however, it is not easy to distinguish words. Chen, Yu, and Zhao (2005) show that identifying words may not be easy for CFL learners because of: (1) the lack of clear divisions between words in the written Chinese; (2) overlaps between morphemes (characters) and words, and between words and phrases; (3) the confusion caused by abbreviations; and (4) the fact that some words may be separated by intervening characters.

Chinese syntactic structures are relatively easy. Hoosain (1991) points out that "grammar as such is not taught in Chinese schools. Instead, what is attended to are the interrelations of meanings of individual characters and the emergent meanings derived from their combinations" (p. 22).

In summary, because of the unique features of the Chinese language, it is of extreme importance to recognize characters, combine them into words, and then understand the words' meanings. In order to read texts smoothly, CFL learners need to possess the knowledge of both characters and words.

Print Reading vs. E-Reading

Hubbard (2000) notes that traditional meaning aids such as dictionaries may provide meaning of language items, but also distract readers from the reading process. Meaning technologies such as hyperlinked dictionaries ("applications that automatically link the words in a text to one or more dictionary entries," p. 3) can be used more easily and effectively (p. 2). Hubbard's summary can be readily applied to the case of reading Chinese texts, with one additional advantage gained from using hyperlinked dictionaries in Chinese: combining characters into words.

E-reading, facilitated by a hyperlinked dictionary, may differ greatly from print reading aided by a traditional paper dictionary. In reading printed materials with a paper dictionary, students may spend substantial amounts of time looking up the meaning of unknown characters and deciding the boundaries of words. In reading electronic texts (e-texts) facilitated by a hyperlinked dictionary, students can easily isolate word boundaries and find out their meanings by moving the cursor over characters. Compared with reading printed materials with a paper dictionary, students reading e-materials with a hyperlinked dictionary can find the meanings of words more efficiently.

Reading Authentic Materials

Reading authentic rather than adapted materials is beneficial to intermediate students for two reasons. First, language teaching pedagogy supports the use of authentic materials in language teaching. As summarized by Savignon (1991), influenced by social linguistic perspectives, communicative language teaching (CLT) uses authentic materials because of "the importance of context—setting, roles, genres, etc.—in interpreting the meaning of a text" (p. 270). Specifically, "as a broad, philosophical approach to the language curriculum," CLT has its core principles achieved by task-based language teaching (TLT) "at the levels of syllabus

design and methodology" (Nunan, 2004, p. 10). According to Nunan (2004), there is no question that authentic materials are used in TLT. Secondly, the ability to read authentic materials gives students a feeling of accomplishment.

Online and Off-Line Hyperlinked Dictionaries

Two kinds of hyperlinked dictionaries are used to aid the reading of e-texts: one is used in an online environment, the other is used off-line, after a piece of software is installed.

For hyperlinked dictionaries used in an online environment, one example is Rikai (*www.rikai.com*).[1] After submitting a Chinese text or a URL of a Web site to the box in the software, the original text or the Web site appears in an output box. If the cursor is put under characters, Chinese words appear in a pop-up box together with English translations.

For an off-line hyperlinked dictionary, one needs to install software on a computer. One example is NJStar (*http://www.njstar.com*). It is possible to download NJStar software to a computer and then use the software to facilitate the reading of e-texts. After the software is installed on a computer, one can copy and paste an e-text to the software, and read it the same way as from the output box of an online hyperlinked dictionary.

Although these two kinds of hyperlinked dictionaries efficiently provide words' meaning in English, they also have limitations. Xie (1999) gives two general observations: they occasionally fail to provide "accurate and context-sensitive interpretations," or fail to provide translations to some words which may appear in a reading text (p. 106).

In a review of the literature in the field, Chun (2006) finds that students prefer to look up "translations of words" when using glosses (p. 93). Because of students' preference, it is rational to study these kinds of hyperlinked dictionaries in detail.

The Effects of Hyperlinked Dictionaries on Reading

No previous study has examined the role of hyperlinked dictionaries in aiding the reading of e-texts in Chinese. Research, however, has been carried out in Roman alphabetic languages. Chun (2006) summarizes research conducted between 1995 and 2005, and concludes that "bilingual dictionaries [hyperlinked dictionaries] and multimedia glosses have a more direct impact on vocabulary acquisition than on overall reading comprehension" (p. 81).

The outcomes of using hyperlinked dictionaries with e-texts in Chinese have not been thoroughly studied. Furthermore, no research has been done to study the impact of hyperlinked dictionaries on vocabulary acquisition and on improving reading comprehension in reading Chinese e-texts. Because of the unique features of the Chinese language, it is worthwhile to carry out studies in the field.

RESEARCH

Chun (2006) summarizes existing studies on the use of "electronic dictionaries and CALL [computer-assisted language learning] glosses" (p. 73) for languages with Roman alphabets, and points out that in those studies, "results must be viewed in terms of the level of the learners' L2 language ability and cannot be generalized to all learners reading in an L2" (p. 77). The studies introduced in this chapter center on intermediate college students.

Because there has been no direct research concerning the effects of using hyperlinked dictionaries on reading authentic e-materials by intermediate CFL learners, this author has conducted a series of research. Guided by a pilot study, the author carried out a qualitative study in order to generate some hypotheses. Then a quantitative study method was used to further test the

hypotheses. In the process of doing the quantitative study, the author interviewed students to gather information on their experience in reading online materials and in browsing Chinese-language Web sites. At last, a survey was designed based on students' comments gathered from the previous quantitative study, and was administered to another group of students to study the features of electronic literacy (e-literacy).

A pilot study was completed during a class session in the spring semester of 2005 at a college to see whether it is practical to let intermediate low CFL students read e-texts with the help of hyperlinked dictionaries. Based on the result of the pilot study, a case study was carried out at the college in the fall semester of 2005 to study the characteristics of using hyperlinked dictionaries in reading authentic e-materials. The case study was conducted once per week throughout the semester. Guided by the findings from the qualitative study, quantitative research was performed from July to August 2006 at an intensive language program in Beijing on intermediate and advanced students to study the impact of using hyperlinked dictionaries on vocabulary acquisition and on reading comprehension. Finally, a survey was administered to another intensive language program in Shanghai in August, 2006 to study how students explore online materials. The survey was distributed by language instructors in different classes, and was completed within 10 minutes.

A Pilot Study

A pilot study was carried out to see whether it is practical to let intermediate low CFL students read e-texts with the help of a hyperlinked dictionary. Eight students with varying proficiency levels (some of them were intermediate low students, while others were still at the entry level) participated in the experiment. They were given 10 minutes to read two paragraphs in the printed version, and then asked to translate the two paragraphs in English. Following that, they were asked to read the electronic version (e-version) of the two paragraphs for another 10 minutes with the help of Rikai, and then to translate the two paragraphs again into English. After comparing the two versions of the translations, this author obtained the following two findings.

A hyperlinked dictionary could not help entry-level students greatly. Even though they were provided with translations of words, their lack of knowledge in basic sentence structures, grammatical patterns, and vocabulary items prevented them from making good use of the hyperlinked dictionary.

A hyperlinked dictionary was effective for intermediate low students who had a good knowledge of the basics of the language. The use of the hyperlinked dictionary enabled them to take advantage of the software to find the meaning of unknown words, and then to use their knowledge of the language to get the meaning of texts.

Based on the findings from the pilot study, it may be inferred that entry-level students do not benefit greatly from using a hyperlinked dictionary, while intermediate low students who have a foundation in basic vocabulary items, patterns, and structures can use the hyperlinked dictionary to understand a text.

A Qualitative Study

Based on the results of the pilot study, a qualitative study was carried out on an intermediate student to study the use of hyperlinked dictionaries in reading e-texts.

General Description

Materials used. Thirty articles were used in the study, taken from the intermediate level of the *Chinese Reading World* (University of Iowa Chinese Program, 2004). These articles ranged from around 100 to 400 characters in length.

Participants and methodology. The student who participated in the experiment was

an intermediate mid student. He first read an article printed from the *Chinese Reading World,* verbally reported on the reading difficulties and his problem-solving strategies, and recorded an English translation using *Audacity* (free software used for recording voice onto a computer). Then the student read the e-version of the same text again with the help of a hyperlinked dictionary (Rikai), reported on his difficulties and strategies, and again recorded an English translation. After finishing reading the two versions of a text, the student was asked to explain the strategies he had used to tackle the reading difficulties.

In their literature review, Everson and Ke (1997) indicated that verbal reports were "a valuable data source for research" (p. 3), and used this data collection method to study reading strategies for CFL learners. In this study, verbal reports were used to determine the student's reading difficulties and problem-solving strategies. In summary, the two translations for each article, verbal reports, and interviews were used as data for the research.

Research questions. The research tried to answer the following questions:

1. What strategies does the student use when reading e-texts with the help of a hyperlinked dictionary?
2. How effective is the hyperlinked dictionary?
3. What are the limitations of the hyperlinked dictionary?

Analyses

This author listened to the two versions of the English translations, and then recorded all the comprehension errors made by the student. Each comprehension error was then analyzed and categorized. The student's verbal reports were also incorporated in the analytical process. Furthermore, the student's comments were used in the process.

Clauses (including key phrases such as titles) were numbered for each article; altogether there were 822 clauses in the 30 articles. Before using the hyperlinked dictionary, the mean comprehension rate of the 30 articles was 41%; after using the online software, the rate rose to 77%. The comprehension rate for each article was obtained by dividing the number of correct translations of clauses by the total number of clauses in that article. For example, if there were 20 clauses in an article, and the student translated five of them correctly, then the comprehension rate would be 25%. After a comprehension rate was obtained for each article, the mean comprehension rate was calculated for the 30 articles.

A closer look at the errors made by the student after using the hyperlinked dictionary revealed the following trends: the largest number of errors were due to the limitations of the hyperlinked dictionary, then to grammatical difficulties, then to the negligence of the student, and lastly to a lack of cultural and background knowledge.

Results

Reading strategies. The student did not use the hyperlinked dictionary to discern grammatical patterns; instead, he used it to get the meaning of unknown characters and words. The student used choice and piecing together strategies when reading electronic articles (e-articles) with the help of the online dictionary. The use of the hyperlinked dictionary to comprehend e-texts involved a bottom-up strategy.

Effectiveness of the hyperlinked dictionary. The student's comments revealed that the hyperlinked dictionary helped him to comprehend the 30 articles. First of all, the English translations of Chinese words helped him substantially in the reading process. He commented that before using the hyperlinked dictionary, he usually did not have a good idea of what the article was about; after using the hyperlinked dictionary, he usually got a general picture of the meaning of the text. Second,

besides giving real help, the dictionary may also help provide psychological support. The student reported that he was not so intimidated to read with the aid of the hyperlinked dictionary. Third, the student confirmed from his own experience of reading the 30 articles that the more he read, the better he could sense of keywords. With the help of the hyperlinked dictionary, he was able to keep on with the reading process.

His two versions of the English translations of the text supplied this author with abundant examples of the effectiveness of the hyperlinked dictionary in improving reading comprehension. He translated many sentences incorrectly after the first reading, yet translated them correctly after using the hyperlinked dictionary.

Analyses of the comprehension rate suggested the same conclusion, that his comprehension increased greatly after using the hyperlinked dictionary. Before using the hyperlinked dictionary, the mean comprehension rate of the 30 articles was 41%, which is obviously inadequate. Therefore, before using the hyperlinked dictionary, the student did not have a general understanding of the texts. After using the hyperlinked dictionary, there was a significant rise in reading comprehension, to 77%. According to Nuttall (1996), in English, an understanding of 70% of a text is generally considered adequate. If we use the 70% benchmark here, the student had an adequate understanding of the texts after using the hyperlinked dictionary. Although the student read the e-version of the same text after he read the printed version, the great difference in comprehension, from an inadequate to acceptable comprehension, could only be credited to the use of the hyperlinked dictionary. It may be concluded that the use of the hyperlinked dictionary was effective in improving reading comprehension for individual articles, and in keeping the student in the reading process.

The limitations of using the hyperlinked dictionary. The hyperlinked dictionary had limitations, and some drawbacks would be easier to address than others. Among the errors made due to the limitations of the hyperlinked dictionary, the most prevailing ones were made because the hyperlinked dictionary at times failed to combine characters into words, and then to give translations of words. For example, a word was composed of two characters; instead of combining the two characters into the word and translating its meaning, the hyperlinked dictionary merely translated the two characters. Also, for some words, the hyperlinked dictionary limited the translations available; but for others, it gave extra translations for students to choose from. The above limitations may be improved by providing a larger database for words, and by providing better translations.

The hyperlinked dictionary did not provide accurate meanings for function words, explain the meanings of grammatical patterns, or provide cultural background knowledge. Because the usage of function words is complicated, it may be difficult to provide good translations for function words in English. Similarly, it may not be easy to provide grammatical patterns and background knowledge by hyperlinked dictionaries.

Conclusion

It may be inferred from the case study that a hyperlinked dictionary can effectively improve reading comprehension for intermediate students. Yet it is also important to caution students against totally relying on the hyperlinked dictionary, due to its limitations. And because students may be greatly involved in the bottom-up strategy while using the hyperlinked dictionary in reading an e-text, it may be useful to encourage them to read the text again without using the hyperlinked dictionary so as to concentrate on the article's global meaning.

Although this author found from this case study that a hyperlinked dictionary could effectively improve reading comprehension, further quantitative studies were needed to make a sound generalization.

A Quantitative Study

This study was carried out to measure the effects of hyperlinked dictionaries on vocabulary retention and reading comprehension. In order to have a clear idea of the effects of hyperlinked dictionaries on intermediate students, advanced students were also included in this study as a comparison group.

Design

Participants. Twenty-three intermediate and advanced students from an intensive summer program participated in the experiment, among which 13 were intermediate and 10 were advanced students. They were placed at intermediate and advanced levels according to a placement test.

Material used. An article was selected for the participants with the help of their instructors to ensure that the article was of the right difficulty level for the students. After the article was selected, it was tested on one student as a pilot study. The article was conceived as difficult for intermediate students, yet not so for advanced students.

Methodology. Students were asked to read the e-text twice; in both instances they were allowed to use an off-line hyperlinked dictionary (NJStar). Immediately after the two readings were completed, they wrote a summary of the text in English. (Immediate recall protocols were used to assess students' reading comprehension in this study. The method is an effective way to measure reading comprehension according to Bernhardt, 1983). This author observed and recorded their mouse movements, recorded time spent in the two readings, and interviewed them after they finished writing the summary. Later, the author graded the English summaries and used the results as the reading comprehension scores for the participating students.

Questions. The study tried to answer the following questions:

1. How effectively can an e-text and a hyperlinked dictionary help students retain vocabulary?
2. How effectively can a hyperlinked dictionary improve reading comprehension?
3. What level of students can benefit most from reading e-texts aided by a hyperlinked dictionary?

Statistical Analyses

The selected text. Participants' placement scores were significantly negatively correlated with the number of lookups ($r = -.559$, $p < .01$) and significantly negatively correlated with reading time ($r = -.563$, $p < .01$). The statistical results indicated that the higher the proficiency level (indicated by placement scores), the fewer new words were encountered in the reading of the selected article, and the less time was spent in the reading process. The statistical results demonstrated that the selected article was appropriate to gauge the level of the students.

Vocabulary retention. There were significant fewer lookups of new words in the second reading than in the first reading ($t = 4.507$, $SD = 22.3$, $df = 22$, $p < .001$). The statistical result showed that students did retain some vocabulary items within a short period of time, as indicated by a fewer number of lookups at the second reading.

Reading comprehension. Students' reading placement scores were not correlated with their reading comprehension scores after using the hyperlinked dictionary ($r = .048$, $p > .05$). Further analyses were carried out to compare intermediate with advanced students.

The difference in the placement reading scores of the two groups of students was statistically significant (Mann-Whitney $U = 27.5$, $p < .05$). The difference in the number of lookups of the two groups was also statistically significant (Mann-Whitney $U = 23.5$, $p < .05$), with the intermediate students encountering more new words. The difference in the time in reading the article by the

two groups was statistically significant (Mann-Whitney $U = 31$, $p < .05$), with the intermediate students spending more time. The difference in the reading-comprehension scores of the two groups, however, was not statistically significant (Mann-Whitney $U = 59$, $p > .05$).

Since the article was more difficult for the intermediate students than for the advanced students, the general expectation was that the reading comprehension scores for the advanced students should be higher than those for the intermediate students. Since the statistical result was not the same as the expectation, it may indicate that the hyperlinked dictionary greatly improved reading comprehension for the intermediate students.

Conclusion

The quantitative research indicates that students are able to retain some vocabulary items within a short period of time. A hyperlinked dictionary may help intermediate students greatly enhance reading comprehension for difficult texts, while its effects on advanced students were limited.

Because the statistical results indicate that students can retain the looked-up vocabulary items within a short period of time, it may be useful to encourage students to read a text twice to reinforce their knowledge of new vocabulary items. Also, in the second reading, it may be a good idea to concentrate on the global meaning of the text.

Interviews with the students revealed the difficulties they encountered in reading online materials and in browsing Chinese Web sites. Based on the interviews, a survey was designed to try to identify students' problems in selecting and reading online materials.

A Survey on Surfing Chinese Web Sites

A survey was administered to 65 intermediate and advanced students on their habits of surfing Chinese Web sites. The preliminary findings indicated that intermediate and advanced students seldom read online articles in Chinese. General difficulties were unfamiliarity with the following aspects: ways to search for a piece of information, the meaning of words used frequently in Chinese-language Web sites, Chinese search engines, and the layout and structure of Chinese Web sites. Because intermediate students are not used to surfing the Chinese Web sites, it may not be practical to let them select online articles on their own to read.

Pedagogical Implications

The above studies indicate that hyperlinked dictionaries can effectively help intermediate students tackle authentic e-materials. Yet these students still cannot be left alone because of the limitations of hyperlinked dictionaries. Also, because students lack necessary skills in browsing Chinese Web sites, they cannot find relevant e-materials on their own. In order to use e-materials and hyperlinked dictionaries to achieve the most desirable results, instructors need to adopt effective pedagogical strategies.

PEDAGOGICAL APPLICATIONS

Because it is practical and beneficial to let intermediate students read authentic e-texts with the help of a hyperlinked dictionary, it is important to incorporate the reading of these e-materials in the curriculum. Brandl (2002) describes three approaches to using Internet-based reading materials: "teacher-determined," "teacher-facilitated," and "student-determined" (p. 87). Because of intermediate students' inability to surf Chinese Web sites, the limitations of hyperlinked dictionaries, and students' limited experience with summarizing articles' meanings, it is essential to have a teacher-centered approach at the beginning. Good practices include: setting up a corpus of e-texts

with embedded questions (with answers provided) to lead students in the reading process, instructing students to use hyperlinked dictionaries to aid reading, and providing methods for searching similar articles to encourage students to do the search on their own. In this way, instructors start giving students some autonomy, moving towards a student-centered approach.

The purpose of setting up a corpus is to expose students to authentic e-materials in a guided way. The goal of reading an e-article in the corpus is to understand the article's main ideas. The hyperlinked dictionary, reading comprehension questions, and detailed feedback to the possible answers of the questions provide support for students during the reading process.

Selection of E-Texts

Because of the limited reading proficiency of intermediate students, e-texts need to be carefully selected to develop students' reading skills. E-texts should be both challenging and comprehensible to intermediate learners with the aid of hyperlinked dictionaries and the feedback on students' answers. This author recommends a number of good practices to use when selecting e-texts. First, e-articles should be between 1,000 and 1,500 characters in length. Because the e-articles are longer than textbook materials for the intermediate level, students need to speed up their reading in order to understand the articles. Second, each e-article should have a clear structure. At the intermediate level, the learning of the language has concentrated on individual words and sentences; the text style has been more spoken than written. Usually students have limited exposure to articles with complete and distinct discourse structures. These e-articles can then push students to form a global picture of the articles' meanings by analyzing discourse structures. Third, the selects should reflect various major text models (e.g., narration, description, exposition). The e-texts can provide a chance to acquaint students with different kinds of well-structured discourses. Fourth, e-articles should discuss a variety of topics (e.g., culture, economics, history, political science, arts, and religion). The content of the e-articles provides information for students to learn. Finally, the e-articles should be the product of educated adult native speakers, so that e-texts are authentic, high-quality reading materials.

Articles can be obtained from the Internet or from printed sources, which need to be scanned and converted into the electronic format (e-format). Then relevant questions are designed and eventually posted on the Internet, along with the original texts. Instructors must be aware of copyright issues and seek appropriate permission, where necessary.

Design of Questions

As summarized by Nuttall (1996), the general purpose of questions for a reading class is to provide support to help students understand a text. Although Nuttall is concerned with questions used in a classroom, this rule is readily applicable to the online context.

Because of the uniqueness of the online environment, where students read a text on their own, the design of the questions becomes even more important. The focus of the questions, similar to those asked in class, "is the text attack skills, which lead to the ultimate goal, understanding the text as whole" (Nuttall, 1996, p. 184).

Format of Questions

Guided by the literature review and based on experience and colleagues' presentations in the field, this author has made a summary of the features for questions' formats. First, questions are in English. At the intermediate level, students with limited experience of extensive reading may be overwhelmed by the e-texts they read. Therefore, with questions in English, students do not need to struggle to get the meaning of ques-

tions. The questions provide a "safety island" for students. Second, questions are inserted within a text because the purpose of questions is to lead students through the reading process; Liao and Tsai (2005) demonstrated different kinds of inserted questions designed for an online article. Third, questions are either multiple-choice or open-ended questions. Multiple-choice questions are broader than true or false questions, do not greatly interrupt the reading process like cloze and rearranging sentences, and provide instructors with more control than open-ended questions. Open-ended questions should be used in a limited way, because it is difficult to provide feedback on students' answers in an online environment. Fourth, when students read the online materials without the benefit of face-to-face interaction, it is crucial to provide feedback in English on the possible answers to the questions, because the feedback helps students to learn in the process. Yao (2005) stressed the importance of feedback in his presentation. Yao thinks that feedback should be carefully designed. For example, for multiple-choice questions, feedback should be given not only for wrong choices, but also for the right choice to explain the reason. This author thinks the most detailed explanation should be given to the right choice because every student eventually comes to this item. The feedback given on the correct answer not only explains why it is right, but also introduces cultural and background information, and explains reading strategies. When open-ended questions are used, after an answer is entered, a correct version needs to be provided for students to compare to their own answers.

Content of Questions

Since questions provide support during the reading process, their main function is to lead students to the comprehension of each paragraph and the text as a whole. Questions on difficult words and sentences may also be asked to help students overcome comprehension obstacles.

A majority of questions center on general comprehension. For the sake of demonstration, a sample e-text with accompanying questions is posted online (http://webpub.allegheny.edu/dept/language/chinese/sample/sample.htm).

The first kind of exercise focuses on summary. For example, after reading a paragraph, students are asked to select an item in a multiple-choice question, which summarizes the major idea of a paragraph (Question 3). In the pop-up feedback dialogue boxes, detailed explanations are given on the meaning and function of individual sentences in the paragraph and the overall meaning of the paragraph.

Additionally, students may be asked to summarize the article after reading the whole text. For example, students are asked to summarize in English the main idea of the message in a text box (Question 14). The writing process aids "the making of meaning" in the reading process as indicated by Zamel (1992, p. 463). Feedback is provided for students to compare with their own answers. For another example, students are asked to orally summarize the meaning and are provided with a correct answer in an mp3 file. These two exercises are extremely important, as they push students to form a global picture of the meaning of the text.

The second kind of exercise involves prediction, listed by Nuttall (1996) as a text attack skill. After reading the title of an article, students are asked to predict what the main idea of the text will be (Question 1). In the questions' pop-up feedback dialogue boxes, explanations of the meaning of the title are given together with cultural background. Students may also be asked to predict the content of the following paragraphs (Question 6). In the pop-up feedback dialogue boxes, explanations are given concerning which sentences lead to the following paragraphs.

The third kind of exercise aims to discern discourse structure, also listed by Nuttall (1996) as a text attack skill. After reading an article, students are asked to group different paragraphs

according to meaning (Question 13). This exercise forces students to think about the interrelationship of individual paragraphs and to learn to discern discourse structures.

Finally, questions may be designed to address difficult words and structures to improve reading comprehension. For example, students may be asked to identify the meaning of a word (Question 4). The pop-up feedback dialogue boxes explain the omission of words in that context. Questions may also be used to clarify the meaning of function words (Question 12). In addition, questions may be used to identify topics in adjacent sentences and introduce the concept of topic chains (Question 5).

Presentation of E-Texts and Exercises

E-texts are provided in two versions. At the beginning, an e-article is provided in a plain version through a link. Students can use hyperlinked dictionaries to read it. Students thus have opportunities to explore the text freely on their own.

After the e-article is read for the first time, students are instructed to read the e-text again; they thus have the chance to reinforce their retention of vocabulary items looked up in the hyperlinked dictionary. During the second reading, they are led through the reading process by questions embedded in the e-article. Feedback is provided immediately to the students in the process of answering the questions.

At the end of the e-article, students are also provided with a link to listen to the text. At the very end, they are provided with tips to search for similar e-articles from the Internet.

Preparation of E-Materials for Online Use

Macromedia Dreamweaver can be used to put e-texts and questions together. In order to provide feedback for each question, CourseBuilder, an extended freeware for Dreamweaver (*http://www.macromedia.com/resources/elearning/extensions/dw_ud/coursebuilder/*), can be used to develop interactive exercises (Tsai mentioned the use of the software for designing online questions in Liao and Tsai's presentation in 2005). The following steps illustrate the basic procedure of preparing reading e-materials for online use: (1) import an html file containing an e-article into Dreamweaver; (2) open the CourseBuilder Extension from Dreamweaver; (3) choose a question type (e.g., multiple choice); (4) enter questions and pop-up messages as feedback; and (5) save the final project and upload it onto the Internet.

The final product is an HTML file, which can be accessed by students online. Students are instructed to use a hyperlinked dictionary (e.g., *Rikai*) to facilitate reading comprehension.

FUTURE TRENDS

Further trends on the effective use of e-texts and hyperlinked dictionaries to improve reading skills for intermediate students may be shown below. One future trend is to incorporate into the curriculum teaching strategies that gradually lead students from a teacher-centered approach to a student-centered one. At the intermediate low to mid level, aided by hyperlinked dictionaries, students can read the authentic e-materials chosen by the faculty members and use questions inserted in the article as a guide in the reading process. At the intermediate high level, students may begin to explore the Internet to find articles of interest with the help of hyperlinked dictionaries. At the advanced level, students need to learn to identify articles of interest and accumulate knowledge in a content area by reading authentic e-texts.

Another trend is to build a corpus of e-texts with questions embedded in each article to be used by intermediate low students. In this way, instructors can share resources.

The third trend is for instructors to teach students not only reading skills, but also e-literacy skills as follows: how to set up Chinese fonts, how to use Chinese search engines and different kinds of hyperlinked dictionaries, how to search for useful information from a typical Chinese Web site, how to judge the authority of a Web site, how to search for relevant information, and how to publish in an online environment. Only in this way can CFL learners really use the e-materials to facilitate their learning of the language. Nowadays, Chinese is a prominent online language. The skills of reading and publishing online materials become more and more relevant in people's daily life and work; therefore, CFL learners need to get special training in acquiring the skills. These trends may not only effectively improve the reading proficiency level for intermediate students, but also prepare them for the real world.

CONCLUSION

This chapter introduces a series of studies on the use of hyperlinked dictionaries and authentic e-materials on intermediate CFL learners. The findings are major ones, as there is no research currently available in the field. Based on the study results, the following conclusions may be drawn. First, the effects of hyperlinked dictionaries on aiding reading comprehension vary among students with different proficiency levels. Intermediate CFL learners benefit most from using hyperlinked dictionaries while reading authentic e-materials. In contrast, entry-level students cannot effectively use hyperlinked dictionaries to handle authentic e-materials, and advanced students find the use of hyperlinked dictionaries less effective compared with intermediate students. Second, it is practical to let intermediate CFL learners read authentic e-materials when aided by hyperlinked dictionaries. Generally speaking, with limited vocabulary, intermediate students cannot effectively comprehend authentic materials in the paper version. This finding reveals the great potential of technology in language instruction. Third, hyperlinked dictionaries can improve vocabulary retention. This finding conforms to the findings of studies carried out on Roman alphabetic languages. Fourth, hyperlinked dictionaries can improve reading comprehension for intermediate CFL learners. Chun (2006) reviews the research on Roman alphabetic languages and concludes that "the research we have thus far on using dictionaries has been inconclusive or contradictory, especially with regard to the relationship of electronic dictionary use and comprehension" (p. 88). The finding indicates that hyperlinked dictionaries may have different effects on different kinds of languages.

E-materials and hyperlinked dictionaries may open new possibilities for instructors teaching intermediate CFL students. First, instructors can incorporate the reading of authentic e-materials much earlier in their curriculum than paper texts and dictionaries. Second, instructors can give their students much more challenging e-materials than paper materials. Third, instructors may use e-materials and hyperlinked dictionaries to teach vocabulary.

Students, however, need to be supported in reading e-texts aided by hyperlinked dictionaries. There are several reasons. First, though hyperlinked dictionaries can aid reading, they cannot teach reading strategies or provide feedback to students' comprehension. Instructors need to use a variety of methods to provide scaffolding to students in the reading process. Second, hyperlinked dictionaries have limitations. Instructors should let students be aware of these limitations, so that students do not totally depend on the dictionaries. Third, students may use hyperlinked dictionaries in the easiest way possible. Lomicka (1998) conducted a study on students of French and noticed that "their use of the glosses was oriented toward the goal of translation and paraphrasing in order to achieve a minimal level of comprehension" (p. 49). Instructors' guidance is needed to help

students reach a deeper understanding. Fourth, intermediate students at different levels (low, mid, and high) vary in their ability to tackle authentic e-materials. Instructors need to adjust supporting strategies accordingly. Fifth, intermediate students lack e-literacy skills. Instructors should teach the necessary e-literacy skills to students so that they can eventually explore Chinese-language Web sites on their own.

There are different ways to provide scaffolding to students. One possible way is to set up a corpus for students to use. Good practice of setting up such a corpus is introduced.

Hyperlinked dictionaries and e-texts enable instructors to better prepare students for real-world language use at an earlier stage. In order to achieve optimal results, however, instructors need to employ systematic strategies to support and guide the students in the reading process.

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KEY TERMS

Chinese Character: The smallest written unit that stands alone in Chinese texts.

Chinese Word: May be composed of one or more characters. A word can be used alone or perform a distinctive grammatical function in a sentence.

E-Literacy: Refers to skills to comprehend and produce online materials.

E-Texts: Texts that can be read from a computer screen.

Function Word: In Chinese, words such as propositions, conjunctions, and auxiliary words are called function words. Take the function word "ma" for example. The word is put at the end of a sentence to indicate that it is a question.

Online Hyperlinked Chinese Dictionaries: Online applications that "automatically link words in a text to one or more dictionary entries" (Hubbard, 2000, p. 3). Specifically, when using an online hyperlinked Chinese dictionary, a user copies and pastes a text or a URL of a Web site into a dialogue box, and then hits an action button to obtain an output box. In the output box, the user can see the pasted text or the Web site. Putting the cursor under a character, he or she can see a pop-up box containing the following: the character (if the character is a word) and its English translation, or a word (if the character combines with the adjacent character to from a word) and its English translation. An online hyperlinked dictionary works when there is an Internet connection.

Off-Line Hyperlinked Dictionaries: Off-line applications that "automatically link words in a text to one or more dictionary entries" (Hubbard, 2000, p. 3). Specifically, before using an off-line hyperlinked Chinese dictionary, a user installs the software on a computer. Then the user can open

the application, and copy and paste a text into the application. Putting the cursor under a character, the user can see a pop-up box with the following: the character and its translation, and a word (if the character combines with the adjacent character to form a word) and its translation.

Scaffolding: Providing "supporting frameworks within which the learning takes place…If the scaffolding is removed prematurely, the learning process will 'collapse'" (Nunan, 2004, p. 35).

ENDNOTE

[1] After visiting the *Rikai* homepage, first select "Chinese to English" in the "Version" dialogue box on the upper right side of the page. Then enter a hyperlink (URL) or copy a Chinese text into the dialogue box on the right. Press the "go" button, and the output box will appear.