Constructing a roadmap to more systematic and successful online reading and vocabulary acquisition

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Abstract

Although vast amounts of authentic materials are now available online to help language learners build up vocabulary and language skills in many languages, the consumer is almost 'spoiled for choice', and often at a loss where to begin. This article aims to provide an overall menu of language- learning and teaching websites, to help both students and teachers select more useful Computer-Assisted Language Learning (CALL) sites and programs, showing how to combine them into an effective online reading and vocabulary learning program for either classroom- or self-access. It will help both kinds of users to be able to better filter through the rivers of online data, to find and focus on what we will refer to as the 'CALL or ESL/EFL gold', meaning websites most content- and media-rich for English as a Second/Foreign Language teaching or learning. Though our discussion will be in English mostly about using these sites to improve English learning, many of the sites included in this framework can be used for learning as many as 140 major languages of the world. While most language learners are still using more traditional classrooms and textbooks, CALL-based instruction is growing rapidly. The practical problem for both teachers and students who have such resources, however, is to find some practical tool to plow through the plethora of online data, useful in helping schools to make a sensible CALL system to help students learn language and vocabulary most enjoyably and effectively. This article begins to suggest how to construct such an integrated CALL program, including many well-designed sites that combine the advantages of using authentic materials with online tools to help simplify them and provide various kinds of language learning support that can aid both students and teachers. Ten established research-based goals for L2 reading are integrated into a proposed framework for using online reading programs in a way that follows a clear 'Taxonomy of Vocabulary Development (Deeper Lexical Processing)'.

1 Introduction

The aim of this article is to discuss as simply as possible the basic areas of vocabulary knowledge and research that need to be understood to improve instruction in this crucial area of language learning, whether online or in traditional classrooms. It re-examines Shei's (2001) dream of having 'flexible textbooks' or a 'portable classroom', in which language learning texts and lessons might be chosen by

students themselves, following principles of self-access learning, or more independent, extensive reading. As Shei (2001) tried to do in an earlier 'Automatic Lesson Generation System', this article will first briefly explore the relationship between reading and vocabulary building, and then invoke theories from second language learning to support the intelligent CALL design principles used when integrating many of the best 'Wonders of the Web' at the writer's http://www.CALL4ALL.us site. We will describe the machinery and modules of this site, giving a working example of its use, followed by a discussion, recommendations for implementation and future research, and a conclusion.

Gamper and Knapp (2002) provided a helpful taxonomy and overview of 40 intelligent computer-assisted language learning systems available at the start of the 21st century. They investigated and classified these advanced systems along five dimensions: (1) Supported Languages, (2) Artificial Intelligence Techniques, (3) Language Skills, (4) Language elements, and (5) Availability. As they noted, 'Many systems focus on single aspects of language learning. What is needed is a more integrated and comprehensive approach which supports also semantics, pragmatics, cultural knowledge and social abilities, using different technologies which are tailored for the training of specific skills.' (pp. 10–11). This review attempts to provide such an integrated, comprehensive plan for CALL-enhanced language and vocabulary development.

Ideally language learners' progress should be monitored by an intelligent tutoring system, one that could adjust the reading levels and sequencing of words needing to be learned by each learner's vocabulary and reading ability, and then repeating exposures in varying new contexts until learned. The only way to actually document and research online learners' behaviours is by using a Course Content or Learner Management System (CCMS or LMS), such as Moodle, to be able to track, archive and assess at least some of students' online learning. Wordchamp.com, for example, offers such a CMS, to help learners or teachers graph their progress, time on task, and types of automatically generated review quizzes each chooses to use in their

study, from 15 available. These will be explained further below.

Although traditional texts have offered various kinds of supporting materials in their lessons, when faced with an authentic text to explore at leisure, learners often lack the forms of language support that they need to make a site or story 'Comprehensible Input', and must abandon the idea of learning on their own. CALL designers must contemplate how to make authentic online materials both more accessible and comprehensible to language students from various language backgrounds, and at very different proficiency levels. Such programs must follow known principles of Second Language Acquisition (SLA) and Second Language Vocabulary Acquisition (SLVA). They must be able to answer these two questions: (1) 'How can creators of the system know whether it is doing any good for the learners?' and a second one raised by Shei (2001): (2) 'How can the learner know whether she is making any progress in language learning using the program to access authentic materials?' (p. 1).

Shei's (2001) idea of automatic generation of language lessons based on authentic texts a learner would import, though unfortunately never made available as an online program, was to 'transform any text the learner would like to read into a format as the learner would have seen in a textbook, with similar supporting materials to help the learner digest the text' (p. 1). Most support was lexical and one advantage of this system was a built-in diagnostic test to determine a learner's functioning vocabulary level when first using the system. His system determined for any imported or uploaded text which words were to be focused on as target terms, or 'highlighted as new vocabulary to be learned according to the learner's proficiency level. The system then provide[d] various information on the target words such as word definition, collocations, synonyms and example sentences to aid the learner in memorising the vocabulary and in decoding the text' (p. 1).

The new framework proposed in this article and illustrated in Tables 1 and 2 integrates the most effective programs found by this researcher online

Table 1 Integrating Websites with major learning phases to systematically teach and track vocabulary development online using a depth of lexical processing scale

Vocabulary learning phase (strategy type) students learn to:	Online tool/URL	Technical learning features/functions	Vocabulary learning results/growth
Attend to and assess new words (pretest voc. level)	(1) Size by V-Check[a] (2) CATSS[b] estimates both Size and Strength of vocabulary) (3) Aspects by VKS[c]	(1) V-Check[a]; (2) CATTS[b] test (3) DAVIE VKS[c]	Pre-test levels Graph progress
Access meaning and examples of use	http://www.CALL4ALL.us D-Page Web Dictionaries; Cobb's Test Engines	LexTutor has the most functions integrated. ('Data-Driven LL')	http://www.WordChamp; LexTutor Concordancer Word Bank, LiTgloss;
Archive	http://www.WordChamp.com	E-Flash Cards/13 Quizzes	Words not recorded are often forgotten.
Analyze	via Word Roots Site(s) Register to get free lessons on Root Words: http://www.vocabulary.com	Give Word/Grammar Parts; Etymology; Relate Form- Meaning, etc.	Multiplying Power of Mastering 1–200 Greco-Roman Roots (Kim Approach)
Anchor	By ClipArt/Audio Clips By Picture/Podcast Cues (via WC Site, etc)	AV Clue/Cue Creation aids learning	WordChamp offers Audio Clips & Clip Art to aid memory.
Associate	By SFKA program at http://www.CALL4ALL.us. (Its V Page Links to course) By Visual Thesaurus By Frequency Level By Word Net, etc.	Pre-Organized Word Set; Thematic/Topical Organization; Related Word Group Associations (Semantic Field Keyword Categories)	Testable Online via 27 Degree of Structure Quizzes ('DOS'): at www.call4all.us ///misc/sfka.php with Chinese/Japanese aids
Activate ASAP/AMAP	By Writing Example Sentences Push Output Production http://www.WordChamp.com to write IV Questions	By Oral versus Live/Chat By Writing Exchanges From Chats to SFKA E-Letters/Skits/Interviews; Make Video/Podcasts	Learners use target words together in collaborative projects.
Recycle/Review any Missed words; Plan New Re-encounters and uses	http://www.WordChamp.com http://www.ReadingEnglish.com Need Individual Account Creation.	13 Online Quizzes using http://www.WordChamp.com CMS	Systematic text Sequencing Programs: Ghadirian (n.d.); Huang & Liou, 2007
Re-assess/re-test	Via DAVIE VKS; or Use http://www.WordChamp.com	Can Graph to compare Pre to Posttest Learning	Charting own growth helps motivate learners!
Predict/produce/use L2 (controlled versus free) via exercises in: (a) Reading cloze (b) Listening cloze	Practice using tests at http://www.LexTutor.ca site:	Cloze Technique; Productive Vocabulary Practice	Automatic recognition shows new words are being retained.

(View Slideshow of some of these programs at http://www.viewista.com/s/*1030801024/ez/1).

[a]V-Check URL: http://www.v-check.jp/index.html?PAGELANG=EN (Estimates vocabulary size).

[b]Computer Adaptive Test of Vocabulary Size & Strength: http://hcc.haifa.ac.il/~blaufer/index.php (Estimates both Size and Strength of vocabulary).

[c]Last Dual Assessment Vocabulary Instructor-Evaluator (DAVIE) Vocabulary Knowledge Scale (VKS) and other original assessment forms by the author are freely available to print and use from: http://www.call4all.us///home/_all.php?fi=../misc/forms.

Table 2 Integrating 10 instructional implications for L2 reading with online programs following a clear taxonomy of vocabulary development (deeper lexical processing)

10 Instructional implications (Grabe, 2004, p. 46)	Phase of lexical processing	Programs/URLs doing so
Ensure fluency in word recognition.	Assess level of word knowledge by VKS, etc.	www.LexTutor.ca/tests/; V-Check at: lexxi-ca.com; Online DAVIE VKS***
Emphasize the learning of vocabulary via: a) Web Dictionaries b) Online Glossing (instant access versus clickable using *WordChamp's WebReader*).	Access new words ASAP (word definitions, sentence Examples, collocations via Concordancers, etc. More Data is better; While reading in Context is best!)	www.CALL4ALL.us Web dictionaries (D-Page); E-card-*WordChamp.com*[a] Lingro.com; *ReadingEnglish.net; LexTutor* Test Engines (uses Data-Driven Learning[b])
Promote extensive reading [*ReadingEnglish.net* does.]	Archive new knowledge after building on L1 concept.	*WordChamp.com*/Lingro.com; *ReadingEnglish.net* all can. Use *LexTutor's HyperText Builder*[b].
Ensure acquisition of linguistic knowledge and general comprehension skills.	Analyze word origin/root, parts, part of speech, etc.	*LexTutor* provides *Master/ Root Word/ Frequency Search* (20 Prefixes for 14k words!)
Promote development of strategic readers rather than mechanical application of strategy checklists.	Anchor using short-term Memory clues/hooks; AV Clips; Mnemonic devices.	[a]WordChamp offers Audio Clips & Clip Art to aid memory. Added TTS Support while reading can Increase learning; Concordance and Reading-Plus support add functions to aid CI of texts.
Teach recognition of text structures and discourse organizational patterns.	Associate by common topic, theme, 'Semantic Field Keyword, function.	Testable Online via 27 Degree of Structure Quizzes ('DOS') at http://www.call4all.us///misc/sfka.php in 9 academic fields. Organize 'Common Clusters'
Activate background knowledge.	Activate word through productive use (LT memory)	*LexTutor Collaborative Concordancer; SFKA's POP (Push Output Production)***
Build reading fluency (accuracy) and rate/speed.	Recycle/Review words by repeated encounters.	Systematic Text Sequencing Programs (*ReadingEnglish.net*) do. *WordChamp* offers 12 kinds of Quiz Reviews![a]
Develop intrinsic motivation for reading.	Re-Assess/Re-Test to check on progress/learning.	Chart learners' growth to motivate them.
Contribute to coherent curricula for student learning.	Practice Predictive & Productive Use (Fluency).	Automatic Recognition shows new words are being retained. Best 4 skills CALL Labs here: (a) http://eslgold.com/[c] (b) www.free-english-study.com (c) www.speak-english-today

[a]Has Course Management System (CMS) built-in. See Sample of Frequency Wordlists at:
<http://www.wordchamp.com/lingua2/Verb.do?text=to%20alter&languageID=13>
Sample of its simultaneous multi-lingual audio Translations and Conjugations at:
<http://www.wordchamp.com/lingua2/Verb.do?text=to%20alter&languageID=13>
[b]Data-driven Learning Materials on the Web: Joybrato Mukherjee's Annotated List of DDL Online Sites and Resources.
(DDL means corpus-based language learning using authentic texts.)
<http://www.uni-giessen.de/anglistik/ling/ALC/ddlweb.html>
[c]These three sites offer the most complete online 4-skills systematic curriculum for 10 areas: Speaking; Listening; Reading; Writing; Grammar; Vocabulary; Pronunciation; Business English; TOEFL / TOEIC; and Idioms at these 5 levels: Low Beginning; High Beginning; Low Intermediate; High Intermediate; Advanced.
**SFKA Site: <http://www.call4all.us///misc/sfka.php> Part of <www.CALL4ALL.us> site.
***On-line DAVIE VKS Form, Vocabulary Learning Strategies Taxonomy and Depth of Lexical Processing forms at:
<http://www.call4all.us///home/_all.php?fi=../misc/forms>.

following a systematic approach to second language vocabulary acquisition (SLVA). Its 10 main phases of lexical processing, shown in the left-most column of Table 1 are 10 major categories or overall strategies of vocabulary learning. These include (1) Attend to and Assess New Words (Pretest Vocabulary Level), (2) Access Meaning and Examples of Use, (3) Archive, (4) Analyze, (5) Anchor, (6) Associate with other related words, whether (a) Word Partners or Collocations, (b) Related Word Groups or Semantic Field Categories, or (c) Topically/Thematically related words, (7) Activate as soon and as much as possible, (8) Recycle/Review any missed words; Plan new ne-encounters and uses, (9) Re-Assess/Re-Test, (10) Predictive Productive Use (Controlled versus Free) via exercises in (a) Reading Cloze versus (b) Listening Cloze. All of these have been discussed earlier in various research articles (Author, 2006, 2007a,b).

2 Literature review

Much has been reported on reading and the long-term retention of vocabulary. In fact, since the 1960s thousands of journal articles and over 400 dissertations on this crucial aspect of language development, including this writer's (Author, 1996), are included in Dissertation Abstracts (noted by Blachowicz et al., 2006). Such studies have shown that words are learned incrementally, as students layer various aspects of new word knowledge they gradually acquire (shown for example in Horst, et al., 1998).

As Johnson (n.d.) found, 'In the field of extensive reading (ER), the number of exposures required for successful acquisition has been widely studied with varied results'. The rate of retention after just a single exposure is quite low (Coady, 1997; Knight, 1994), and studies have recommended a minimum of 5–12 exposures needed to acquire the major aspects of a new word, with an average of seven encounters being seen as needed even by programs developed for online learning. Nation's (1990) literature review notes that between 5 and 16 exposures are needed.

Gu's extensive review of the vocabulary acquisition literature acknowledges this discrepancy and summarizes points of agreement as follows: 'The number of exposures needed for the mastery of a new word hinges on many other factors such as the *salience of the word in context* (Brown, 1993), the *richness of contextual clues*, the *learner's interest* and the *size and quality of his/her existing repertoire of vocabulary* (Laufer, 1997; Nation and Hwang, 1995)'. (Gu, 2003, para. 19, this writer's emphasis). Other factors noted by Johnson which affect word learning through extensive reading include the '*time between exposures, student awareness of target vocabulary* and *availability of enhancement tasks*. Regarding time between exposures, while cramming may be sufficient for passing a test the next day, *repeated exposures over timed intervals,* also known as *spaced repetition,* is a more effective method of preserving information in long-term memory' (Johnson, Online). This work will examine how computers can help to make such *repeated exposures over timed intervals* or *spaced repetition* both more enjoyable and effective for language learners.

Blachowicz et al. (2006) have reviewed the most common questions regarding vocabulary arising in classrooms, noting these eight major strands thereof:

(1) What do we know about vocabulary knowledge?
(2) What do we know about good vocabulary instruction?
(3) Which words should be taught?
(4) Who should choose the words to be taught?
(5) What approaches can bridge the early learning 'vocabulary gap'?
(6) What specific strategies or approaches can help English-language learners (ELLs)?
(7) Can technology be used to enhance vocabulary learning?
(8) What do we know about assessment and other little-researched issues?

In this article we will focus mainly on questions 5 and 7 above. For many ideas and several detailed taxonomies of vocabulary learning strategies (VLSs), see Author (2006) and Schmitt (1997). Questions 7)

'What approaches can bridge the early learning 'vocabulary gap'? and (9) 'Can technology be used to enhance vocabulary learning?' will be examined to see how CALL technology can help to both bridge the early vocabulary gap or threshold, as well as to make it and all subsequent vocabulary and related language learning more enjoyable and effective.

In 2001, Shei tried to develop an automatic language lesson generation system called 'Follow You!' It was then hoped that this program might go beyond its ability to generate lessons based on certain corpus, or to provide student modelling mechanisms, to also addressing issues of phrasal and sentential structures. In this way, the designer had hoped that this automatic language generation system would become a 'viable bridge between the traditional textbook and the ever-expanding repertoire of authentic materials available online' (p. 2) ...whereby learners might cross the 'information highway' in their target language. Although students' interest is often maintained using more innovative, multimedia CALL materials, it is not yet clear in the minds of many language teachers and E-learning site developers what specific kinds of language learning support students need, particularly in terms of vocabulary, listening/AV and how to effectively blend collaborative learning and social networking to maximize their learning.

Recently, Lenders (2008) asked whether using electronic glossing was worth the effort? A main result of his study and others on glossing is that electronic glosses are seen as being useful and appropriate by language learners. They are also more motivated to use glosses when they see them as being important and relevant to their future careers. Lenders concluded that glossing can help to enable more active vocabulary learning when authentic texts are used along with accompanying tasks that require language use.

While vocabulary glossing of various kinds can be provided to help keep learners going, it does not seem realistic to leave the acquisition of syntax and discourse to their own 'language learning device' to take care of itself. More innovative language learning programs online need to be systematically and fully integrated into various web browsers, as

WordChamp.com's WebReader Toolbar does, so that learners can access the supporting materials instantly, while using various web pages offering practice in all four communication skills at various proficiency levels, without having to resort to a separate program. Technical extension of *FollowYou!* into a web browser was never done, but *WordChamp.com* now works in any major browser. Its toolbar can be downloaded into *Firefox, Linux* or *Windows*. Shei's well-envisioned 'Automatic Lesson Generator, Follow You!', was never developed for public Internet use, so that other CALL researchers could not analyze or test it. However, many similar programs have since proliferated on the web. These are either free Open Source programs, such as those advocated in this overview study, or commercial, which tend to be quite expensive for school site licenses, as well as limited in terms of content or with menus in a non-English national language.

What Follow You! failed to do, *www.English Reading.net* and other multi-level, multi-skill online language labs such as *www.ESLGold.com* have accomplished, as we will illustrate further below. (See WordChamp.com Account Creation Explanation Page: <http://www.wordchamp.com/lingua2/HelpStudent.do>. Vocabulary Drill Demonstration Page: <http://www.wordchamp.com/lingua2/QuickDemo.do>.)

A slideshow giving screenshots of 10 of these most useful programs that we integrated into a systematic online reading and vocabulary development approach are shown at <http://www.viewista.com/s/*1030801024/ez/1>. Just three of these sites listed in Table 2 offer the most complete online 4-skills systematic curriculum the author has found out of 5,000 CALL sites researched, for the following 10 areas: Speaking; Listening; Reading; Writing; Grammar; Vocabulary; Pronunciation; Business English; TOEFL / TOEIC; and Idioms at these five levels: Low Beginning; High Beginning; Low Intermediate; High Intermediate; Advanced. These are all related to the ESLgold.com set of sites, which provide over a thousand pages of free information and resources for both teachers and students. All materials are organized by skill and level for quick

and easy access, with explanation and menus also available in fifteen major languages. (5,000 other such programs may be viewed and tested at the author's site, www.CALL4ALL.us).

2.1 Good vocabulary instruction and word learning skills

Blachowicz *et al.* (2006) are correct in stating that good vocabulary instruction makes word learning a core consideration in all grades and subjects of a school, throughout the day and across the entire curriculum. As they state, to foster good vocabulary development, institutes need to have 'a comprehensive, integrated, school-wide approach to vocabulary in reading and learning [in general] . . . We believe that a consensus has emerged from research about the components of such a comprehensive and integrated program of instruction (Blachowicz *et al.*, 2006; Graves, 2006; Nagy, 2005)' (pp. 526–527). Three major components involved in good vocabulary instruction, explained in great detail by these writers, include having teacher (1) create language- and word-rich learning environments, (2) intentionally teach vocabulary selected from a carefully selected and principled approach, and (3) develop word-learning strategies proven to be effective in helping other learners retain and use new words.

We can briefly characterize these three most essential components of good word learning. First, a language- and word-rich learning environment is one where 'word consciousness' is encouraged, new words and concepts are explored and celebrated, and opportunities for using them in various language arts and communication activities are provided for. Second, an intentional teaching of carefully selected vocabulary must be based on knowing which words are most frequent and essential for text comprehension, not only in the language at large, but also in specific target texts and major fields being studied by learners themselves. Various aspects of knowledge need to be available and provided using multimedia wherever possible, to enhance learning enjoyment and memory retention. Effective instruction, whether face-to-face

or online, and both print and online dictionaries need to provide learners with 'multiple types of information about each new word, as well as opportunities for repeated exposure, use and practice' (Blachowicz, et al., p. 527). Finally, students need chances to learn new words independently, and to activate them productively as soon and as often as possible. Thus effective vocabulary learning instruction will include an emphasis on vocabulary learning strategies (Author, 2006), stressing not only good Discovery Strategies, but especially strengthening Consolidation Strategies, building long-term retention through consistent use and repeated interactive practice.

As Anderson and Nagy (1991) have noted, a systematic program for vocabulary development designed to meet needs of learners at different levels will aim to: (1) teach words that are strategic to academic success and not typically acquired independently, and (2) include systematic procedures to make students independent word learners, primarily by helping them become voracious readers. Baker *et al.* (1998) described for the U.S. Office of Special Education Programs how classes or online instruction can show evidence of clear curriculum design for intentionally planned vocabulary acquisition. Such vocabulary learning strategy training needs to be clear and explicit to both teachers and learners. As they define them,

> *Strategies* are sequences of teaching events and teacher actions which make explicit the steps that enable a learner to achieve an outcome. In vocabulary development, for example, strategies represent procedures to facilitate (a) word learning at a desired level of understanding, and (b) independence in the implementation of word learning strategies. Many students develop efficient vocabulary learning strategies on their own. Research indicates, however, that diverse learners are likely to develop the same strategies as their normal achieving peers, but tend to use them less efficiently (Griswold *et al.*, 1987). By making strategies conspicuous, teachers can better understand where, why, and how strategy use succeeds and fails. (Baker *et al.*, 1998, p. 4)

Developing consistent computer-assisted habits of systematically organizing learners' processing of new lexis can probably best help them to maximize their TL vocabulary development. These would naturally include the steps of regularly: (1) Attending to and Assessing which words are new and important to learn to comprehend meaning; (2) Accessing those new word forms, meanings and usages; (3) Archiving them, (4) Analyzing them, (5) Anchoring them using short-term memory clues, (6) Associating them for long-term retention, (7) Activating them, (8) Reviewing/ Recycling, (9) Reassessing, and then (10) Relearning them by Re-meeting or Repeated encounters with such TL vocabulary, in many contexts with new syntactical forms.

Discovery strategies include attending and assessing, accessing, archiving, and analysis. *Consolidating strategies* included anchoring, associating, activating, and reassessing, recycling, and reviewing (Author, 2006). Finally, to help non-native readers better apply effective vocabulary and comprehension text-processing strategies, as well as to help improve models of L2 reading and our understanding of the development of L2 mental lexicons, we should focus our learners' attention on strategies that are important for remembering new words, and for better comprehending entire texts, written or aural.

While developing more consistent use of these essential strategies is crucial, learners need to also be encouraged to work on the primary skills of (a) Anticipation or prediction of meaning, and (b) Automatic word, phrase and meaning recognition, *building ever larger chunks of meaningful comprehension*, which would apply to both reading and listening texts and tasks. PCs can help to better chunk these learning tasks more appropriately for each individual learner's level and needs. Though there are other important aspects of word knowledge that affect the degree of difficulty in word learning, many of these aspects tend to only develop as language learners gain more exposure over time. Laufer (1997, Table 1) charted intralexical factors which affect vocabulary learning, dividing them into *facility versus difficulty-inducing factors*. Though she also felt that word length, part of speech and concreteness versus abstractness of a word had no clear effect, it would seem natural that shorter words, more active and imaginable actions/verbs and concrete objects/nouns should be easier to both teach and learn.

2.2 What makes words easier or harder to learn and to test?

The following are both more common and important factors in the development of L2 vocabulary knowledge, and are likewise much more amenable to practical tests. We might call them *more transparent aspects* of vocabulary knowledge, whereas less observable features of vocabulary knowledge could be called *more opaque features*. These are much more difficult aspects for language learners to acquire, especially those from more culturally diverse, non-cognate language backgrounds. Laufer (1997) further summarized generally agreed upon aspects involved in knowing a word as including: (1) form—pronunciation and spelling, (2) word structure, (3) syntactic pattern, (4) meaning—referential, affective or pragmatic, (5) lexical relations, and (6) common collocations. This final aspect should include various kinds of pre-fabricated, multi-word units or 'lexical chunks', such as idioms, phrasal verbs, etc.

Factors that affect word learnability include aspects of their sound/prounounceability; structure/orthography; length; aspects of meaning or morphology including multiplicity of meaning versus words having just one meaning for one form; similarity with other words or synformy; grammatical usage or part of speech; idiomaticity; degree of concreteness versus abstractness; and specificity or register restrictions deemed appropriate in various socio-cultural contexts or areas of use (Laufer, pp. 140–155).

Computers can help to build up learners' knowledge, not only of individual words, but also of how to encode the meaning of entire sentences and passages of discourse. Barry (2002) looked at favorite reading strategies contnet area teachers say they use, also showing in a survey why they use them. Chun (2006) did a meta-analysis of online reading and vocabulary learning programs in which she examined how CALL technologies could help to

improve L2 reading. A summary of her findings will be helpful in providing a clearer 'Roadmap to Successful Second Language Vocabulary Acquisition'.

Chun's (2006) meta-analysis of 'CALL Technologies for L2 Reading' includes relevant CALL studies about the following major areas, overlapped using Grabe's (2004, p. 46) 10 instructional implications for L2 Reading, from his previous overviews of that literature: (1) Ensure fluency in word recognition, (2) Emphasize the learning of vocabulary, using both electronic dictionaries and multimedia glossing [whenever possible], (3) Activate background knowledge, (4) Ensure acquisition of linguistic knowledge and general comprehension skills, (5) Teach recognition of text structures and discourse organization, (6) Promote development of strategic readers rather than mechanical application of strategy checklists, (7) Promote extensive reading, (8) Build reading fluency and rate, (9) Develop intrinsic motivation for reading, and (10) Contribute to a coherent curriculum for student learning (summarized from Chun, 2006, Table 1, p. 71). These 10 goals for L2 reading are also integrated into the proposed system for using online reading programs in a way that follows a clear 'Taxonomy of Vocabulary Development (Deeper Lexical Processing)', based on Author, 2006, as shown in Table 2.

3 Research question and method

How can CALL technology be most effectively integrated to provide a systematic framework for helping language learners to improve their vocabulary and online reading skills? This question is answered here and by using the writer's large CALL website, which integrates about 5,000 language learning links and programs to help students learn to use 10 major phases of vocabulary learning. In doing so, we are assuming that our goal in L2 reading and vocabulary development is to achieve the most effective integration possible of online programs that meet Chun (2006) and Grabe's (2004, p. 46) 10 instructional implications for L2 Reading as outlined above. Programs and websites linked from our site

and recommendations for how they can best be integrated to help learners focus systematically on these most essential lexical and language processing stages will be described below.

Measuring and improving language learners' comprehension monitoring is just as important as helping them to develop effective L2 reading strategies. As Yang (2002) noted,

> The most critical issue in the development of comprehension monitoring is how it can function most efficiently and automatically. So far, proficient readers' consistent, dynamic, and continuous comprehension monitoring process, and the influence of teacher intervention on enhancing the development of comprehension monitoring, seem to promise a bright future. The problem of figuring out the right resources to use in fostering the acquisition of automatic and effective comprehension monitoring may be solved by an awareness of less-proficient readers' incapability in the categorization of information. Unskilled readers tend to have sporadic information in their minds. That is, they seem to store what they have learned in an unsystematic and unorganized way. As a result, when activation of relevant information is required, they might well have to spend a lot of time searching for the information, which leads to inefficiency and non-automaticity of comprehension monitoring. [Online]

Yang concludes from these insights and examination of Chinese students' reading comprehension monitoring and strategies that less-proficient readers need to develop their English reading texts using a clear system of categorization. Both *TextLadder* and Shei's 'Automatic Language Lesson Generator' sought to do this in experimental software programs. Although such experimental programs provided a guide for CALL developers, they were never made publicly available or put online. This article shows how the functions which their pilot programs foresaw are integrated within the writer's website, and may be used for any other online reading lab (ORL), following his

recommended system to help maximize vocabulary and language learning for almost 140 of the world's languages.

To overcome the problem of most authentic material being too demanding for EFL/ESL learners, especially the majority at lower proficiency levels, their teachers should enable them to select articles that have language learning support tools with multimedia and exercise function buttons available whenever possible. The reason for this is clearly stated by Yang: 'In this way, less-proficient readers learn vocabulary with the categorization explicit and so internalize what they have learned according to categories instead of sporadically. Since less-proficient readers are likely to benefit less from organizing knowledge independently, then the categorization of items through teachers' purposely planned instruction might facilitate less-proficient readers' learning.' (p. 1, Online)

Online texts (or print texts too, for that matter) should be sequenced most efficiently for language learners so as to be (1) at the most appropriate vocabulary level, starting with most high-frequency, lower grade levels; (2) with articles organized for easy choice by learners, according to their own major fields of study and interest; (3) recycle vocabulary an average of 5–7 times, in a variety of contexts wherever possible, since multiple encounters encourage maximum retention; (4) pre-organize groups of related words, either topically/thematically for lower level learners, or by Semantic Fields under common keywords for intermediate to advanced learners; and (5) provide pre- and/or post-reading supplemental exercises, which research (Wesche and Paribakht, 1996; Rosszell, 2007) clearly supports as being a far more effective approach to second language vocabulary acquisition (SLVA) than random incidental readings.

The online reading lab that best meets these conditions is *ReadingEnglish.net*. The site is described by its designer Ghadirian (2002) as a computer program that 'sorts through a collection of [online] texts and (1) finds texts with a suitably high proportion of target words, (2) ensures that . . . most or all target words are encountered five or more times, and (3) creates an order for reading these texts, such that each new text contains a reasonably small number of new target words and a maximum number of familiar words.' (p. 1). His program first determines which words make up 96% of words in a learner's target domain or major, such as economics. Target words are then systematically sequenced and gradually introduced by this program, so that learners encounter all of them five or more times. It uses *Voice of America* texts, originally with sound available, though disabled now it seems. This online reading lab has 10 interesting topic areas, but most importantly provides glossing for any word learners click on, which can be saved and reviewed later. This online lab gives learners enough encounters to build long-term retention, as well as pre-reading vocabulary matching and post-reading writing summaries which provide the supplemental practice most students need to strengthen their retention of new terms.

4 Major factors to consider when designing online reading labs

The four major areas affecting online reading strategy use that CALL designers, teachers and researchers need to consider and plan for when designing or using online reading and language labs or random authentic sites are these: (1) Learner's background knowledge and major areas of interest and need, (2) Learner's degree of computer skill/literacy, (3) Degree of language proficiency and (4) Text topic and difficulty level.

Two good examples of online reading labs which have planned for all of these aspects, designed with regional language support for Chinese learners are those of Huang (whose well-balanced model is illustrated in Figure 1) at English Reading Online at <http://cai.iem.sju.edu.tw/josephine/english.htm>, and The Candle Project <http://elearning.eng.ntnu.edu.tw/CANDLE/index.php?lang=en&page=main&>. Huang *et al.* (2006) studied four major categories of online strategies used by her Taiwanese learners: support, socio-affective, problem-solving and global strategies. Her study found that the online reading strategies most
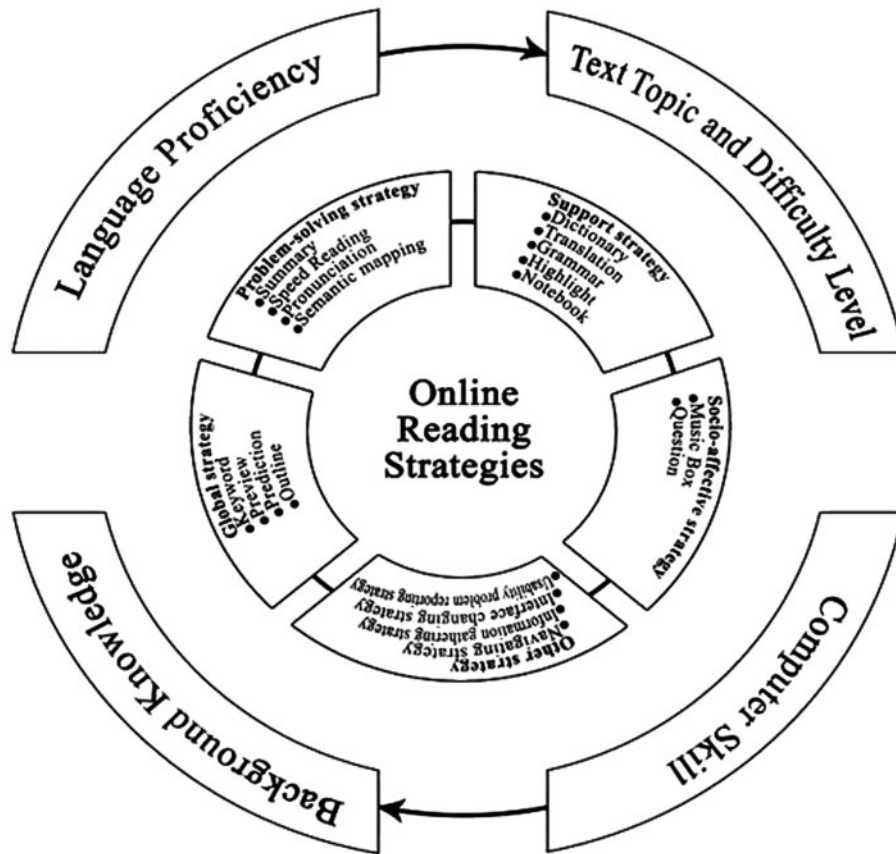
Figure 1 Online reading strategies to plan for when designing online reading labs (from English Reading Online.com co-researcher's site, Huang, 2006).

frequently used by her learners were Support strategies, like using translation or dictionaries which could give them immediate feedback, due to their concern for convenient and immediate access to online information. By contrast, Problem-solving strategies that required more effort on their part, as in drawing semantic maps, and testing reading speed were used the least. Other strategies deemed important to learners were functions that helped readers navigate online texts more smoothly, find relevant information to build up their background knowledge, establish a personal environment to facilitate their online reading, or the chance to make suggestions for user-friendly website design. Both *The CANDLE Project* and *Huang's English Reading Online* site (shown below in Figure 1)

bring students very pleasant and rewarding online reading experiences, by adding various bilingual tools and strategies to help Chinese students in particular.

5 An integrated roadmap to systematic and successful SLVA

(1) *Attend to and assess new words (pretest vocabulary level)*—To help learners focus on new words and assess their knowledge about them before reading, these eight logically organized processing recommendations are given in Table 1, Phase One: (a) Have learners check on their vocabulary size

using V-Check online <at lexxica.com>; (b) Have them use this writer's or another Vocabulary Knowledge Scale (VKS) for both pre- and later post-test assessment (freely available at <http://www.call4all.us///home/_all.php?fi=./misc/forms>; (c) Take Computer Adaptive Tests of Size and Strength (CATSS) tests at <http://www.vocabulary.co.il/games2/vocquiz/vocquiz.php> to estimate students' vocabulary size and strength; d) Have them take any of the four types of vocabulary levels tests using Cobb's www.LexTutor.ca/tests/ site: (i) Recognition Levels Test (four types are offered), (ii) Productive Levels Test (five levels with three forms to choose from), (iii) Word Associates Test and (iv) Yes-No Test (similar to the V-Check).

CATSS is a test of vocabulary size, the number of words the learner knows, and strength, which is the combination of four aspects of knowledge of word meaning (active recall, passive recall, active recognition, passive recognition). Vocabulary size is tested via samples of words from different word frequency levels. Vocabulary strength is reflected in four test stages, each test stage testing one modality for each word, starting with the most difficult one (active recall) and ending with the easiest one (passive recognition). Simple definitions and examples of these terms from Laufer (in personal correspondence) are:

(a) *Passive recognition* is the ability to recognize an appropriate word meaning among several word meanings for a given word form.
(b) *Active recognition* is the ability to recognize an appropriate word form from among several word forms for a given meaning;
(c) *Passive recall* is the ability to supply an appropriate word meaning for a given word form; and finally,
(d) *Active recall* is the ability to supply an appropriate word form for a given concept.

(2) *Access meaning and examples of use*—using any of these kinds of tools:

(a) Both learner's preferred bilingual and monolingual web dictionaries, thousands of which are conveniently organized on the D-Dictionaries page of the author's <www.CALL4ALL.us> site.
(b) *WordChamp.com* can find bilingual or monolingual word meanings while learners are making E-Flashcards online.
(c) Since it's best to learn new words in context, use *ReadingEnglish.net* to help learners develop their vocabulary through or while reading various online articles. This top online reading lab (ORL) allows students to choose interesting Voice of America articles from 10 topical areas, providing bilingual glosses in various languages for any word clicked, which can also be saved for later review. It also gives them pre-reading vocabulary matching quiz and an after reading writing summary exercise, and even used to include audio. *ReadingEnglish.net* is most highly rated because it most effectively integrates all four language skills, and many of these most essential phases of vocabulary development being discussed.

(3) *Archive or record*—information about new words requires both a mechanical and mental means of storage. These need to be bilingualized and long-term, not just while online. Three programs offering this to learners to enhance their online vocabulary learning are *Lingro.com*, *Word Champ.com*'s *WebReader* and *ReadingEnglish.net*. As an example, consider all the functions available in *Lingro.com* shown in Figure 2. *WordChamp* has by far the most functions to enhance word-learning of these three, with 15 kinds of quizzes that can be auto-generated from any wordlist made. On the other hand, while it has an unsurpassed glossing engine, *WebReader*, servicing nearly 140 languages, *WordChamp* lacks any dedicated online reading lab with texts arranged sequentially, topically or by frequency, which is the main advantage of using *ReadingEnglish.net*.

(4) *Analyze*—analyze word origin/root, parts, part of speech, etc. Mountain (2002) provides an interesting word game for building such skills, learning a strategy that builds vocabulary and comprehension while motivating young readers.

Figure 2 Functions of Lingro.com for solo or collaborative vocabulary learning.

(5) *Anchor*—anchor using short-term memory clues/hooks, devices, AV Clips, etc.

(6) *Associate with other related words*—whether (a) word partners or collocations, (b) related word groups or semantic field categories or (c) topically/ thematically related words. Associate by common topic, theme, semantic field keyword or function.

(7) *Activate as soon and as much as possible*— through productive use (for LT memory).

(8) *Recycle/Review all target words*—by repeated encounters. Plan new meetings/ uses.

(9) *Re-assess/re-test*—to check on progress in learning, especially for any missed words after recycling them.

(10) *Practice predictive and productive use*—to develop both speedy and accurate recognition of word, phrase, sentence and complete textual

meanings. Practice both 'Controlled' and 'Free Production' via exercises in (a) Reading Cloze versus (b) Listening Cloze. These after all are the goals of fluent, independent reading.

6 Best blend of programs recommended for effective online reading labs or study

For any text imported by either teacher or student, *LexTutor.ca* can generate a rich amount of supporting materials such as audio, word definitions, collocations, example sentences from a corpus/concordancer, etc. so learners can study online texts as if they were textbook lessons.

When ReadingEnglish.net is used, words are re-encountered so as to strengthen long-term retention naturally through repeated use.

Although *FollowYou*! envisioned this goal as a pilot software, when three major programs are combined with CMS and mobile use—*ReadingEnglish.net, WordChamp.com* and *LexTutor.ca*—as illustrated in Table 2, we can actually achieve the 'intelligent learning companion', 'dynamic textbook' or 'portable classroom' first idealized by Shei (2001). The philosophy behind the design of Shei's system was that 'authentic language materials are helpful to the learner if not essential, and that vocabulary acquisition is pivotal to reading and language learning. The ultimate goal is for the language learner to be exposed to as many authentic materials as possible, through the learner's interest in the texts of their own choice, and the system's help in supporting corpus-based materials and student modelling' (p. 2, Online).

Only the first two of these programs (*ReadingEnglish.net* and *WordChamp.com*) can also monitor the cognitive development of students' vocabulary and systematically increase their word knowledge through corpus analysis or the use of a well-integrated Course Management System (CMS).

Limitations of these programs: Though we have not yet developed a good, universally available tracking and data collection method for testing the systematic use of these recommended programs, we will soon be using 'Screen Capture' with AV to do so within the CMS Moodle learning environment, along with interviewing students about their online reading and vocabulary learning strategies employed online using a talk-aloud protocol (TAP).

7 Discussion

Just as Chun (2006) addressed each of these areas to see how CALL technologies could better address the needs of teaching and researching second language reading, this article sought to find effective ways to better meet these needs by integrating specific CALL software or online programs, strategies and approaches at the researcher's site. Their systematic, integrated use for L2 vocabulary and reading

development is illustrated in Table 1, and described below. In short, language learners can greatly benefit from having a memorable framework at hand to use when meeting new words. Three simple ABC processes to keep in mind using an author-designed anagram are to:

(1) 'Always Attend to and Assess, or Ask Questions' about any new words. For example, ask what can I tell about this word's form, part of speech, etymology, are there any clues from within or around the word as to its meaning or use? This phase should include both (a) Attending to a new word/phrase's form/part of speech, and (b) Assessing one's level of knowledge about the Word(s), by using some form of Vocabulary Knowledge Scale (see one suggested in Table 1), even an informal mental Vocabulary Checklist, or a formal Pretest of one's vocabulary knowledge levels regarding a particular word or set of target words.
(2) 'Be sure to Discover' as much as you can about various aspects of any new word as soon as possible, and 'Be Sure to Record' them for future review and use.
(3) 'Consolidate new words into your long-term working memory by following a set of effective strategies.' Recycle the new word(s) as often as possible through these most essential phases of word-learning, as explained here in this article.

8 Concluding recommendations and prognostications for future research

Various new types of online reading comprehension and vocabulary development programs and tests were compared in this overview to consider how useful they may be for guiding individual or classroom L2 reading instruction. It explored how these programs seek to test and teach new L2 vocabulary learning and reading comprehension strategies more innovatively and accurately. Several programs were

Table 3 Summary of Doughty and Long's language teaching methodological principles for CALL

Language learning (LL) principles & processes: LL activities and input:	L2 implementation	CALL implementation
Use tasks, not text, as the unit of analysis.	Use TBLT, Target Tasks;	Move from tutorials to world-ware and simulations.
Promote learning by doing.	Pedagogical Tasks	Monitor proper sequencing.
Elaborate input (do not Simplify or rely solely on authentic texts.	Emphasize Interactional Negotiation & Modification of Meaning; Elaboration.	CMC, discussion, authoring tools and participation in discourse communities online
Provide rich input.	Expose to varied input.	Use DDL Corpora and Collaborative Concordancing.
Encourage inductive/'chunk' learning.	Implicit instruction.	Design and coding features.
Focus on having fun.	Guide attention.Map form to function.	Design and coding features.
Provide negative feedback.	Give error feedback.Error correction/recasts.	Response feedback.
Respect learner syllabi and developmental process.	Time intervention to LL's developmental readiness	Stress flexible adaptivity.Multi-level learning modules
Promote cooperative/collaborative learning.	Negotiate meanings via interactional modification.	Problem-solving; CMC; Discussion; Open-ended Web-Quest projects and Discovery-Learning.
Individualize instruction.	Do needs analysis. Note LL's differences. Strategies and Styles.	Autonomous learning stresses Adaptivity and Branching Opportunities.

Source: Adapted from Doughty and Long (2003).

reviewed, compared and combined to suggest the use of a comprehensive, recycling model of second language vocabulary acquisition (SLVA), in order to help maximize effectiveness in online reading and vocabulary learning for students of various foreign languages, as well as to improve teaching and testing in these crucial areas.

We have discussed language learners' needs when faced with online reading and language learning tasks, integrated many of the most promising online programs for meeting those needs effectively, and discussed some of the great potential of using these programs in a well-integrated and systematic way as outlined in our framework in Table 1. There are still various problems in need of further research to exploit the full potential of intelligent technologies in modern language learning environments. These include comparing which of these CALL features, tools and programs are most well-suited to learners at different levels of proficiency and from various cultural and linguistic backgrounds, as well as individuals having a wide variety of

learning styles and media preferences. Doughty and Long's (2003) 'Language Teaching Methodological Principles for CALL', summarized in Table 3, give us an excellent flowchart guide for planning and integrating these areas to help optimize distance FLL.

Learning training in the use of appropriate strategies, both metacognitive in general and specific vocabulary and grammar learning strategies, need to become part of course design and teaching approaches, both in class and online. As Skehan (2003, p. 408) has noted, 'the web provides incredible potential for autonomy in language learning—what is also required is the opportunity to learn to use that autonomy productively'. Surely using these publicly available programs systematically as outlined in this review (also viewable at http://www.viewista.com/s/*1030801024/ez/1 in a Slideshow of some of these programs) can enable language teachers and researchers to build a more viable bridge between traditional textbooks and the ever-expanding repertoire of authentic materials

available online, just as Shei had earlier envisioned, to help improve reading and language learning using CALL more systematically.

References

Anderson, R.C. and Nagy, W.E (1991). Word meanings. In Barr, R., Kmil, M.L., Mosenthal, P.M., and Pearson, P.D. (eds), *Handbook of Reading Research (vol. 2)*. New York: Longman, pp. 690–724.

Author. (1996). *Developing and Testing Vocabulary Training Methods and Materials for Japanese College Students Studying English as a Foreign Language.* Ed.D. Dissertation on file with Pensacola Christian College, Pensacola, FL. Available either from ERIC Center for Applied Linguistics via fax to (202) 429-9292; or from UMI Dissertation Services, 30 No. Zeeb Rd., PO Box 1346, Ann Arbor, MI 48106-1346. Retrieved from: http://www.eric.ed.gov/ERICWeb Portal/Home.portal?_nfpb=true&ERICExtSearch_ SearchValue_0=JOHN+PAUL+loucky+japanese& searchtype=keyword&ERICExtSearch_SearchType_0 =kw&_pageLabel=RecordDetails&objectId=0900000 b8013f95d&accno=ED406844&_nfls=false%20%20 20%20 (accessed 11 November 2009).

Author. (2006). Maximizing Vocabulary Development by Systematically Using a Depth of Lexical Processing Taxonomy, CALL Resources, and Effective Strategies. *CALICO Journal,* **23**(2) (January): 363–399.

Author. (2007a). Measuring and improving online reading. *Reading Matrix Online Conference Presentation* and article with Audio PowerPoint Presentation at: http:// www.readingmatrix.com/conference/pp/proceedings 2007/loucky.pdf (accessed 11 November 2009).

Author. (2007b). How to Improve Comprehension of Any Text Using Online Tools. In Bradford-Watts, K. and Swanson, M. (eds). *Extensive Reading Forum: Motivation and Community Through Extensive Reading. JALT 2006 Conference Proceedings: Community, Identity, Motivation Conference*. Tokyo: JALT, pp. 989–97. http://jalt-publications.org/archive/ proceedings/2006/E098.pdf (accessed 11 November 2009).

Baker, S.K., Simmons, D.C. and Kameenui, E.J. (1998). Vocabulary Acquisition: Curricular and Instructional Implications for Diverse Learners. In Simmons, D.C., and Kameenui, E.J. (eds). What Reading Research Tells Us About Children With Diverse Learning Needs Bases and Basics. Routledge, pp. 219-238. Retrieved from http://books.google.co.uk/books?id=qI4yi4CX7YkC &pg=PA5&lpg=PA5&dq=What+Reading+Research +Tells+Us+About+Children+With+Diverse+ Learning+Needs+Bases+and+Basics&source=bl& ots=Fqn6nJYfm-&sig=3HM9DFQTH5jcUdOpTBZVu 79QZKQ&hl=en&ei=dxcNS8PfBszRjAft5JTTAw&sa= X&oi=book_result&ct=result&resnum=3&ved=0 CBUQ6AEwAg# (last accessed 25 November 2009).

Barry, A.L. (2002). Reading strategies teachers say they use. *Journal of Adolescent & Adult Literacy*, **46**(2): 132–141.

Blachowicz, F. and Ogle, W.-T. (2006). Vocabulary: Questions from the classroom. *Reading Research Quarterly*, **41**(4): 524–39.

Chun, D. (2006). CALL technologies for L2 reading. In Ducate, L. and Arnold, N. (eds), *Calling on CALL: From Theory and Research to New Directions in Foreign Language Teaching.* CALICO Monograph Series, Volume 5, 69–98.

Coady, J. (1997). L2 vocabulary acquisition through extensive reading. In Coady, J. and Huckin, T. (eds), *Second Language Vocabulary Acquisition: A Rationale for Pedagogy*. Cambridge: Cambridge University Press, pp. 225–37.

Doughty, C. and Long, M. (2003). Optimal psycholinguistic environments for distance foreign language learning. *Language Learning & Technology*, **7**(3): 50–80. Available at http://llt.msu.edu/vol7num3/doughty/.

Ghadirian, S. (2002). Providing controlled exposure to target vocabulary through the screening and arranging of texts. *Language Learning & Technology*, **6**(1): 147–64.

Gamper, J. and Knapp, J. (2002). A review of intelligent CALL systems. Computer Assisted Language Learning, **15**(4): 329–342.

Grabe, W. (2004). Research on teaching reading. *Annual Review of Applied Linguistics*, **24**: 44–69.

Gu, P. (2003). Vocabulary learning in a second language: person, task, context and strategies. *TESL EJ*, **7**(2); Retrieved from http://www – writing.berkeley.edu/ TESL – EJ/ ej26/a4.html (accessed 8 March 2005).

Horst, M., Cobb, T., and Meara, P. (1998). Beyond a clockwork orange: acquiring second language vocabulary through reading. *Reading in a Foreign Language*, **11**(2): 207–23.

Huang, H.-C., Chiou-lan C., and Chih-cheng, L. (2006) EFL learners' online reading strategy use and text comprehension.

Johnson, A. (n.d.) Retrieved http://www.skwrl.org/lin8016/teaching2.htm (accessed 20 March 2009).

Knight, S. (1994). Dictionary use while reading: the effects on comprehension and vocabulary acquisition for students of different verbal abilities. *Modern Language Journal*, **78**: 285–99.

Laufer, B. (1997). What's in a word that makes it hard or easy: Some intralexical features that affect the learning of words. In Schmitt, N. and McCarthy, M. (eds), *Vocabulary: Description, Acquisition and Pedagogy*. Cambridge: Cambridge University Press, pp. 140–55.

Lenders, O. (2008). Electronic glossing: Is it worth the effort? *Computer Assisted Language Learning*, **21**(5): 457–81.

Mountain, L. (2002). Flip-a-Chip to build vocabulary. *Journal of Adolescent & Adult Literacy*, **46**: 62–68.

Nation, I. S. P. (1990). *Teaching and Learning Vocabulary*. New York: Newbury House.

Nation, P. and Hwang, K. (1995). Where would general service vocabulary stop and special purpose vocabulary begin? *System*, **23**: 35–41.

Rosszell, H.R. (2007). Extensive reading and intensive vocabulary study in a Japanese university. Unpublished Temple University Dissertation.

Shei, C.-C. (2001). FollowYou!: an automatic language lesson generation system. *Computer Assisted Language Learning*, **14**(2): 129–144.

Shei, C.-C. (2001). FollowYou! an automatic language lesson generation system. *Computer Assisted Language Learning*, **14**(2): 129–144.

Schmitt, N. (1997). Vocabulary learning strategies. In Schmitt, N. and McCarthy, M. (eds), *Vocabulary: Description, Acquisition and Pedagogy*. Cambridge: Cambridge University Press.

Skehan, P. (2003). Focus on form, tasks and technology. *Computer Assisted Language Learning*, **16**(5): 391–411.

Wesche, M. and Paribakht, T. S. (1996). Assessing vocabulary knowledge: depth vs. breadth. *Canadian Modern Language Review*, **53**(1): 13–40.

Yang, Y. F. (2002). Reassessing readers' comprehension monitoring. *Reading in a Foreign Language*, **14**(1): 18–42 Retrieved: http://nflrc.hawaii.edu/rfl/April2002/yang/yang.html.