Using Technology to Assist in Vocabulary Acquisition and Reading Comprehension

Andreea I. Constantinescu
anconst {a t} u.washington.edu
University of Washington, (Seattle, Washington, USA)

Vocabulary plays an important part in second language acquisition and academic achievement. This paper will present several possibilities to enhance vocabulary acquisition and reading comprehension with the help of technology.

Introduction

The role that vocabulary knowledge plays in second and foreign language acquisition has long been neglected. However, vocabulary is currently receiving increased emphasis in the language teaching curriculum. This is due to several reasons, such as the influence of comprehension-based approaches to language development, the research efforts of applied linguists, and the exciting possibilities opened-up by the development of computer-based language corpora (Nunan, 1999: 103). Moreover, it is now increasingly pointed out that there is a reciprocal, well-documented relationship between vocabulary knowledge and reading comprehension. As Tozcu and Coady (2004: 473) point out, learning vocabulary is an important aspect of L2/FL acquisition and academic achievement and is vital to reading comprehension and proficiency, to which it is closely linked.

This paper will focus on various possibilities to enhance vocabulary acquisition and reading comprehension with the help of technology. First, it starts with a brief overview of the relationship between vocabulary knowledge and reading comprehension. It continues with a presentation of different technological aids that trigger improved vocabulary acquisition and reading proficiency, with a focus on annotations. Finally, it proposes several teaching principles related to incorporating technology in the language classroom to benefit vocabulary acquisition and reading comprehension.

Vocabulary Acquisition and L2/FL Reading Comprehension

Reading is an active skill that involves the reader, the text, and the interaction between the two. The acquisition of reading skills is a very important aspect of first (L1) as well as second (L2) or foreign language (FL) literacy. Reading in a L2 or FL is a dynamic and interactive process, during which learners make use of a variety of skills and strategies, combined with background knowledge, L1-related knowledge and real-world knowledge to arrive at an understanding of written material (Aebersold and Field, 1997: ix).

Many variables play a role in L2/FL reading comprehension. Among the most important are L1 literacy, the use of both top-down and bottom-up strategies, activating background knowledge, the use of various reading skills (e.g. summarizing, identifying the main idea, distinguishing between facts and opinions), and vocabulary knowledge (Egbert, 2005: 21-22).

Several researchers have argued that vocabulary plays a major part in reading proficiency. Thus, Grabe (1991) stresses the important role of vocabulary as predictor of overall reading ability, and Nation (1990) states that effective L2 /FL instruction should also concentrate on cultivating vocabulary (both cited in Anderson, 1999: 25). Chanier and Selva also stress the fact that vocabulary knowledge is a key factor in reading comprehension (1998: 489) and so does Groot (2000), who argues that functional L2 reading proficiency requires mastery of a considerably large number of words.

Aside from knowing how to use the appropriate reading strategies, Grabe (1991, as cited in Butler-Pascoe and Wiburg, 2003: 124) argues that fluent L2/FL readers need to know about 2,000 to 7,000 words and sometimes even more if they want to reach native-like fluency. Similarly, Groot (2000: 62) argues that an adequate understanding of academic texts

requires a vocabulary of at least 7,000 words. Generally, L2/FL readers need to recognize approximately 95 per cent of the words in a given text in order to comprehend its meaning and they need to know the different meanings of words according to context, as well as words' grammatical properties. In summary, it can be pointed out that reading and vocabulary are inter-related, in other words, good readers have a rich vocabulary, and similarly, a rich vocabulary is one of the key elements that ensure reading proficiency.

Benefits of CALL for Vocabulary Acquisition and Reading Comprehension

It has been increasingly argued that computer technologies can support learning in a number of ways. Many features of the computer are considered to enhance vocabulary development and reading comprehension: multimedia is one of them. Multimedia refers to computer-based systems that use various types of content, such as text, audio, video, graphics, animation, and interactivity. The key concepts of multimedia are thus 'computer-based' and 'interactive'.

Some research assessed the general value of ESL / EFL software programs for improving reading comprehension and vocabulary (AlKahtani, 1999; Busch, 2003; McGlinn and Parrish, 2002). More recent studies examined the effect of extended use of computers on reading achievement, the effect of computer instruction on reading rate and reading comprehension; the effects of multimedia software on reading comprehension and vocabulary acquisition, as well as the relationship between vocabulary development and reading comprehension (Singhal, 1998: 2-6). Most research on vocabulary acquisition and CALL has focused on the effects of multimedia glosses, and the same is true for reading comprehension, since vocabulary and reading are closely and reciprocally related. This reciprocal relationship also accounts for the fact that many research studies on vocabulary development and CALL also examine reading comprehension, and vice versa.

Multimedia Glosses and Vocabulary Development

One of the first to examine the effects of multimedia glosses for vocabulary development were Lyman-Hager and Davis (1996), who integrated a computer program into the French foreign language curriculum and discussed vocabulary acquisition and students' glossing choices for 262 intermediate level students studying French. Two conditions were used in this study: computerized reading and non-computerized reading using an excerpt of Oyono's 'Une Vie de Boy'. Both groups had access to glosses: the computer group had access to multimedia annotations, whereas the control group could consult printed text with the same glosses. As to whether or not computer treatment offered significant benefits to FL students, the results of the written recall protocol indicated that the experimental group who used the computer program to read the text significantly outperformed the control group who used the glossed reading in the print form.

Similarly, in an article exploring multimedia annotations and vocabulary acquisition, Chun and Plass (1996a) present the positive results of three studies with students in their second year of German who used Cyberbuch, a multimedia application offering various types of annotations (picture, text, video). The goals of this study included the exploration of incidental vocabulary learning, and the examination of the effectiveness of multimedia annotations on vocabulary acquisition. The results of this case study supported previous research on the effectiveness of different types of annotations, according to which visual imagery was found to help in learning and retention of new foreign words. Moreover, visual multimedia advance organizers were found to help not only recalling new words, but also act as facilitators of reading comprehension, which stresses the close relationship between vocabulary and reading (Chun and Plass, 1996b: 512). Text+picture annotations produced the best results in the recall protocol focusing on reading comprehension.

Using Multimedia for Vocabulary-building

However, multimedia is not used only for glossing texts. Multimedia is a central component of good computer-assisted skill-building software. Thus, Chanier and Selva (1998) stressed the benefits of multimedia support for learning L2/FL vocabulary and presented ALEXIA, a lexical learning environment for French as a L2/FL, which includes a corpus of texts, a general and a personal dictionary, and a lexical activities unit. After reviewing various viewpoints about the effectiveness of multimedia for vocabulary learning, they propose useful criteria for evaluating the quality of a visual representation in a lexical environment. Groot (2000) presented another multimedia-enhanced computer-assisted word acquisition program, called CAVOCA, whose

aim was to speed up the vocabulary acquisition process. CAVOCA is an interactive program that takes learners through different stages of vocabulary development: deduction, consolidation, and long-term retention.

Similarly, Tozcu and Coady (2004) conducted a case study that examined the outcomes in vocabulary acquisition when using interactive computer-based texts as opposed to traditional materials. The aim was to determine the effect of direct vocabulary instruction via computer assisted learning as opposed to traditional vocabulary training via print texts. Moreover, the effect of this direct instruction on reading comprehension and word recognition speed and therefore reading rate were also analyzed. The subjects of the study were 56 intermediate level students from various L1 backgrounds who were studying English for university academic preparation. The results suggested that the treatment group, who used a tutorial computer assisted courseware, outperformed the control group in all the three analyzed areas: vocabulary knowledge, reading comprehension, and reading speed. These results suggest positive implications of integrating technology in the language classroom for reading instruction and vocabulary development.

Benefits of Multimedia-enhanced Dictionaries

Other research that focused on vocabulary development with technology argued for the increased effectiveness of multimedia-enhanced electronic dictionaries designed specifically for English language learners, and which have several built-in aids that their book counterparts cannot provide (e.g. the Longman Interactive English Dictionary, the Oxford Picture Dictionary Interactive, etc.) (Butler-Pascoe and Wiburg, 2003: 126-127).

Vocabulary-development Software without Multimedia Components

However, not all software for vocabulary development has a multimedia component, and a good example is concordance software, which triggers good results, since it allows for the examination of lexical, syntactic, and semantic patterns in various reading passages and contexts (Anderson, 1999: 32). This type of computer program can be a valuable instructional tool to raises students' awareness of the various types of lexical items in authentic contexts and provides non-threatening classroom experiences giving students opportunities to improve reading and vocabulary skills (Butler-Pascoe and Wiburg, 2003: 128).

Benefits of Multimedia for Reading Comprehension

Multimedia is a great instructional component not only for vocabulary instruction, but also for reading comprehension, as some of the research presented above has suggested. The positive effect that multimedia has on reading comprehension comes, according to Busch (2003: 278), from the great advantage that online readers have over traditional printed readers: the possibility to enhance computerized texts with glosses in multimedia format. This is probably the reason why most studies dedicated to a computer-based approach to reading have focused on the usefulness of glosses in different formats to increase reading comprehension and vocabulary retention. Several researchers have argued for the positive effects that hypermedia has for L2/FL readers, because a text can be made more comprehensible for them by annotating it with multiple types of media glosses (Sakar and Ercetin, 2004: 28).

The effects of multimedia glossing received increased attention as researchers considered the possibility that computer-aided reading could create more proficient readers by offering a choice of various types of glosses to develop better vocabularies, greater background knowledge surrounding the text, and more effective reading strategies (Lyman-Hager and Davis, 1996: 775). Various studies argued that multimedia glossing is beneficial for reading comprehension and, consequently, for L2/FL vocabulary acquisition. Thus, Lomicka (1997) explored how multimedia annotations influenced the level of FL reading comprehension for students enrolled in a second semester French course. Three conditions were used when students were reading a text on the computer screen: full glossing, limited glossing, or no glossing. The results indicated that the students who had access to full glossing improved better than those who had access to either limited glossing or no glossing. Similar results were also suggested by Sakar and Ercetin (2004), who went even further and explored 44 adult intermediate-level EFL learners' preferences for hypermedia annotations. The results suggested that students preferred visual annotations to textual and audio annotations. Video and graphic annotations were accessed when students wanted to retrieve background information about the topic, and graphic annotations were used to illustrate the meanings of words.

In **summary**, it can be pointed out that vocabulary and reading comprehension are closely related, as it may be seen from the

case studies presented above nearly all studies focused both on vocabulary and reading proficiency as they are influenced by multimedia. Vocabulary plays an important part in reading comprehension and techniques that are useful for vocabulary development (such as multimedia glossing) also benefit reading comprehension, and vice versa.

Teaching Principles

Given the fact that this paper has focused on various ways in which technology can assist in vocabulary acquisition and reading proficiency, the teaching principles that I suggest relate to the use of CALL in vocabulary and reading development.

First Principle: Instructors Should Pay More Attention to the Existence of Various Teaching Tools

The first principle I would like to propose is related to vocabulary acquisition and technology, namely, instructors should pay more attention to the existence of various teaching tools that help in vocabulary development, both traditional, and technology-enhanced. Apart from the traditional vocabulary teaching techniques (e.g. bilingual lists), instructors should also be aware of the potential of integrating technology in the language classroom. Thus, for vocabulary acquisition, instructors could make great use of technology by using multimedia glossed texts, electronic dictionaries, corpora and concordance software, as well as various vocabulary-building software.

Second Principle: Instructors Should Introduce Multimedia-glossed Texts into Their Vocabulary/Reading Classes

The second principle I propose is related to vocabulary development and glosses. As it can be concluded from the various research studies presented above, one great way to increase vocabulary acquisition and retention is the use of computerized reading passages enhanced with various types of glosses. As research has suggested, multimedia glossing triggers better results when compared to print glosses. Moreover, full glossing seems to be the best facilitator of vocabulary acquisition and reading comprehension, as opposed to little or non-glossed texts. In addition, best results in retention are triggered by picture + text annotations, whereas pronunciation, video, and audio glosses seem to correlate negatively with reading comprehension. Multimedia glossing is, however, a valuable tool that can assist in vocabulary acquisition and recall, as well as in reading proficiency and should, therefore, be integrated by TESOL instructors in their vocabulary and reading classes.

Third Principle: Instructors Should Be Acquainted with the Criteria for Software and Courseware Evaluation

The third principle I find of great value for future ESL and EFL teachers, as well as for L2/FL instructors in general, who decide to use technology in their classrooms, is that they should be acquainted with the criteria for software and courseware evaluation (e.g. goals, presentation, appropriateness, outcomes), as well as take into consideration two very important factors: time and effort. Teachers must be aware that there are many different types of software or online materials available for ESL / EFL, however, not all of them are valuable for classroom instruction. Some materials focus on specific skills, while others focus on a wide range of skills and strategies. Moreover, instructors should also ensure that the materials used in class are motivating for students and are at an optimum, 'i+1' difficulty level, so that progress can be attained. Teachers should also pay attention to students' level of familiarity with computers and keep in mind whether the chosen software will trigger the desired outcomes.

Fourth Principle: Instructors Should Keep Up with Current Methodology and Make Best Use of Visuals and Multimedia

A fourth principle I would like to propose is for CALL instructors / developers. Thus, given what we currently know about the reading process and the various aids that help increase vocabulary acquisition, it is important that computer-based instruction designed to teach vocabulary and / or reading skills, is based on the current knowledge and methodological principles about how to best teach them.

Moreover, good CALL programs should make best use of visual elements and multimedia glossing, as well as generate

students' participation. The programs should be interactive, allowing the students to make choices. Also, they should consist of a wide range of different types of exercises in which students not only choose the right answers but also type in answers.

Conclusion

To conclude, there is a reciprocal relationship between vocabulary acquisition and reading comprehension. The better the students' vocabulary knowledge is, the better they perform with reading comprehension tasks. Similarly, the more the students read using the appropriate skills and strategies, the more their vocabulary develops. Multimedia plays an important part in both vocabulary acquisition and reading comprehension; therefore, instructors should be aware of the potential benefits of integrating technology in the language classroom.

Bibliography

- Aebersold, J.A. and M. L. Field. (1997) From Reader to Reading Teacher. Issues and strategies for second language classrooms. Cambridge University Press.
- AlKahtani, S. (1999). Teaching ESL Reading Using Computers. The Internet TESL Journal, V (11). http://iteslj.org/Techniques/AlKahtani-ComputerReading/
- Anderson, N. (1999) Exploring Second Language Reading. Issues and Strategies. Boston: Heinle & Heinle Publishers.
- Busch, H.-J. (2003) Computer Based Readers for Intermediate Foreign-Language Students. Educational Media International, 40 (3-4), pp. 277-185.
- Butler-Pascoe, M. E. and K. M. Wiburg. (2003) Technology and Teaching English Language Learners. Pearson Education, Inc. pp. 114-137.
- Chanier, T. and T. Selva (1998) The ALEXIA System: The Use of Visual Representations to Enhance Vocabulary Learning. Computer Assisted Language Learning, 11 (5), pp. 489-521.
- Chun, D. and J. Plass. (1996a) Effects of Multimedia Annotations on Vocabulary Acquisition. The Modern Language Journal, 80 (ii), pp. 183-198.
- Chun, D. and J. Plass. (1996b) Facilitating Reading Comprehension with Multimedia. System, 24 (4), 503-519.
- Egbert, J. (2005) CALL Essentials. Principles and Practice in CALL Classrooms. TESOL, Inc.
- Groot, P. (2000) Computer Assisted Second Language Vocabulary Acquisition. Language Learning & Technology, 4 (1), pp. 60-81.
- Lomicka, L. (1998) ãTo gloss or not to glossä: An investigation of reading comprehension online. Language Learning & Technology, 1 (2), pp. 41-50.
- Lyman-Hager, M.-A. and J. Davies. (1996) The Case for Computer-Mediated Reading: Une Vie de Boy. The French Review, 69 (5), pp. 775-792.
- McGlinn, J. and A. Parrish (2002) Accelerating ESL Students' Reading Progress with Accelerated Reader. Reading Horizons, 42 (3), pp. 175-189.
- Nunan, D. (1999) Second Language Teaching & Learning. Boston: Heinle & Heinle Publishers. Pp. 249-298.
- Sakar, A. and G. Ercetin. (2004) Effectiveness of hypermedia annotations for foreign language reading. Journal of Computer Assisted Learning, 21, pp. 28-38.
- Singhal, M. (1998) Using Computers as Reading Instructional Tools: Applications and Implications. ERIC ED419225.
- Tozcu, A. and J. Coady. (2004) Successful Learning of Frequent Vocabulary through CALL also Benefits Reading Comprehension and Speed. Computer Assisted Language Learning, 17 (5), pp. 473-495.