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TECHNOLOGICAL AND PEDAGOGICAL CONSIDERTATIONS FOR A MORE EFFECTIVE ELECTRONIC GLOSSARY

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Abstract

The electronic glossary is a new addition to second language (L2) vocabulary learning and instruction. This technologically advanced tool offers features that are not attainable through any other conventional instructional medium, such as devising different modalities, i.e., pictures, animations, video, sound, immediate access, reader control, and absence of interruption. To allow a tool with such attributes to effectively enhance L2 vocabulary learning, various considerations from different points of view need to be taken into account. This paper offers some important technological and pedagogical factors that should be considered to fully exploit the potential of an electronic glossary. Within the domains of technology and pedagogy, specific points covering a wide range of issues are identified, and their subsequent implications are highlighted.

Introduction

Second language (L2) reading specialists pay close attention to the potential capabilities of an electronic glossary in enhancing L2 vocabulary knowledge and instruction. Researchers are inspired by the wide variety of digital resources computer technology makes available. Such resources--which provide multiple exposures to new words and provide immediate access to vast amounts of information--including pronunciation of the target words, pictures, vivid animations, video, and textual definitions. Numerous studies have been conducted on the impact of an electronic glossary on L2 vocabulary learning (e.g., Al-Seghayer, 2001; Chun & Plass, 1996; Davis & Lyman-Hager, 1997; Duquette, Renie, & Laurier, 1998; Groot, 2000; Hulstijn, 2000; Laufer & Hill, 2000; Lomicka, 1998; Lyman-Hager & Davis, 1996; Lyman-Hager, Davis, Burnett, & Chennault, 1993), but little is written about the pedagogical and technological factors that need to be considered to amplify the potential effectiveness of an electronic glossary on L2

vocabulary learning. The question is no longer whether an electronic glossary is effective; rather, it is how to optimize its effectiveness.

Creating optimal conditions requires that considerable attention be paid to important pedagogical and technological issues that should guide the design of an electronic glossary. The aim of this paper is to present some technological and pedagogical considerations that are derived from theoretical speculations, empirical accounts, and design and pedagogical principles. It should be mentioned that the proposed considerations should be applied to incidental and intentional L2 vocabulary learning. In the following sections, an attempt will be made to pinpoint some technological considerations. Secondly, various pedagogical considerations will be spelled out.

Technological Considerations

The central discussion of the technological considerations revolves around several design factors. In discussing each technological factor, an attempt will be made to introduce each consideration, shed light on the reasons for considering it, and offer some practical suggestions.

Display Location and Reorienting the Reader

The way in which a glossed word is displayed and its location are also important technical considerations. The designated definitions should appear in an area that is separate from the text so that the text in question is not covered or replaced. Making the definitions cover part of the text or appear on top of it interrupts the process of reading, as noted by Chun (2000), Leffa (1992), and Roby (1991, 1999), and does not provide context for the glossed word. Readers need to be shown the annotated words in their context while reading the definitions. Black et al. (1992) speculated that if readers lose sight of the text, they might be less willing to

consult the defined lexical items because it interrupts the flow of reading.

An ideal place for the annotated words display would be in an area separate from the text. When readers click on a word, the definition window immediately appears in a separate glossary window that is adjacent to or alongside the text being read. This location allows learners to see the word in its context while they are reading the definition. Another suggestion that serves the same purpose is to make the glossed words appear at the bottom of the screen below the text (See Figure 1 for an illustration of such design).

Another technological issue related to placement is assisting readers to easily return to the point in the text where they paused to consult a defined word. Cueing readers in an electronic glossary environment is crucial because of the importance of sequence when moving through electronic-based text and guiding readers' movement through the reading. Wood (2001) states that hints and clues prevent users from getting lost, point them in the right direction, and help them find their way through the computer program.

Several techniques can be implemented to help readers relocate their place in the text after reading a definition. The words already consulted can be shaded, for example in gray, and the words currently being examined can be shaded in black in the main text. Alternatively, once the examination of a definition is completed, a message alert can be displayed that indicates the area in the text where the reader left off.

Number of Words to be Glossed

The number of words to be glossed is an important related issue. The available technological capabilities of the computer allow us to provide word-for-word definitions. However, although this makes the program impressive from technological point of view, from a pedagogical perspective it may overwhelm readers, as argued by Roby, (1999). Computer

designers and instructors should be selective and choose key words that are crucial for understanding the text under study and words that have a high probability of being unknown to the target group. In a similar vein, Black et al. (1992) reported that readers were most likely to consult the glossary only for words that they did not know.

Signaling Readers to the Available Glossed Words

Readers need to be alerted to the available electronic glossary entries. The importance of signaling is derived from the fact that vocabulary learning is less likely to take place without attracting readers' attention while readers must simultaneously pay enough attention to words that are defined in the electronic glossary (Hulstijn, 2001; Laufer & Hill, 2000; Nation, 2001). Furthermore, making the defined words typographically distinguishable or visually salient within the text is expected to encourage users to check word meaning. Black et al. (1992) and Ridder (2002) found that signaling the available glossary in the form of highlighting increased readers' willingness to consult the glossed entries.

Different signaling techniques can be incorporated to draw learners' attention to the glossed words, including boldfacing the words or using a font color different from the text so that glossed words stand out. Hot buttons, in combination with other modalities, can also be built in. Other possibilities for making the defined words visually distinguished are underlining and use of indicators such as an asterisk (see Figure 1).

Techniques for Assuring Consultation

The intended software should be designed to use techniques which ensure that the available glossary is consulted and make users more willing to do so. Reinking (1990) indicated that if readers are not situated in an environment that encourages them to consult dictionary

entries, few tend to do so. In another study, MacGregor (1988) found that students' vocabulary learning increased only when the computer required them to look up the defined words. In a similar vein, Karp (2002) contended that merely making the defined words available to readers makes it difficult to ensure that readers do indeed check the provided electronic entry.

To ensure that the provided glossary is used, designers can set up the program so that users cannot advance to the succeeding segment of the text until they check the meaning of glossed words in the preceding segment. Another suggested approach is to make the annotated words visually salient. This technique, as attested by Black et al. (1992), might make readers ask themselves whether or not they knew the defined words. Readers may also question the fact that if these words were already known or familiar, the designers would not have considered defining them. It also can be done by embedding tracking function device (TFD) that reminds users to check the defined words that they may fail to consult. The TFD traces users' actions and if the users check the available glossary entries, nothing should happen. However, if they fail to check some of the provided definitions, they will see a message suggesting that they should go back and check the missed ones.

Instructors can contribute to glossary consultation by explaining the efficacy of the electronic glossary to the students to ensure use of all informational categories available. Teachers should encourage students to exploit the different modalities when looking up the meaning of unfamiliar words.

Multimedia Components

The attributes of the multimedia components to be included in the program are another essential consideration. Peeck (1993) states that the characteristics of visual aids are extremely significant in any learning situation. In order to increase learners' motivation to exert the mental

effort required to learn the unknown words, each media element should be used for a specific purpose and be subject to various weights. Molitor and Mandl (1989) emphasize that it is not the presence of visual aids themselves that should concern us, but their didactic functions. Visual aids should be included with a specific purpose in mind, that is, to provide further relevant explanation of the defined words. Under no circumstances should visual aids function as mere decorations in the presentation of the software.

To clarify meaning and assist vocabulary learning, visual aids--including graphics, pictures, animations, and videos--should be of good quality, interesting, relevant, have consistency in terms of formats and appearances, and carefully selected. In addition, visual aids should not be associated with a particular culture. As noted by Brett (1995), users are best able to devote their time and mental resources to learning tasks when motivated by a clear visual presentation and high quality sound. Karp (2002) suggested in order to help learners form mental connections between verbal and visual modes of information processing, designers should make an effort to select communicative images.

If the program developer chooses to include a pronunciation feature, the quality of the prerecorded speakers and the soundtrack should be high. Some program developers and instructors tend to incorporate a recording or speech recognition feature that allows users to record their own pronunciation of words appearing in the text and then compare it with the prerecorded native speaker model. If this feature is included, the program should provide a sound controller feature that allows users to repeat the recorded definition and slow the speed of the audio track.

Tracking Device

Among the technological devices that should be embedded into software that offers an

electronic glossary is a user-behavior tracking device. Software with such a feature tracks and records every action readers make when interacting with the available glossed entries, including which words they choose to view, how much time (in seconds) the readers spend on a particular word, and whether they are interested in the target language definition or in translation into the first language. Without the presence of this technological tool, it is impossible to know whether or not the users looked up the annotated words. A number of L2 reading specialists concur on the importance of including user-behavior tracking technology and the potential it holds for instructors, computer program developers, and researchers. A tracking feature allows these practitioners to explore learners' look-up behaviors and simultaneously examine the process and final product involved in learning vocabulary (e.g., Collentine, 2000; Ercetin, 2001; Hulstijn, 2000). Additionally, such information would help professionals, especially computer developers, create a feasible electronic glossary that is compatible with language learners' needs and presents the information in modes that help them understand the meaning of defined words more effectively.

With such a tracking device, computer designers could, for example, design a program to record users' look-up behaviors as they work with a program and store such information in files under each student's ID number or name. Instructors can then examine these files and identify student look-up behaviors. With such information, instructors can identify each student's preferences, strategies, and other relevant information, and can then create an electronic glossary environment that meets the students' specific needs.

Pedagogical Considerations

This section will provide an account of some of the pedagogical considerations for an electronic glossary. It is divided into five separate discussions about: (a) coaching, (b) criteria for selecting words to be glossed, (c) accommodating individual differences, (d) proficiency level of learners and context-specific definitions, and (e) assessment. As with the technological considerations, an attempt will be made to introduce each consideration, shed light on the reasons for considering it, and offer some practical suggestions.

Coaching

Training students to use software in the most beneficial way is vital. Students are presumably accustomed to traditional or printed dictionaries and might not be well acquainted with how to operate and interact efficiently with an electronic glossary. It is assumed that informing potential users beforehand of the best ways of using an electronic glossary makes them familiar with both the program features and consulting techniques (Barnett, 1993). Orienting a user in how to use an electronic glossary also reduces the expected cognitive load imposed on learners due to the new computerized instructional environment. Such orientation will help users to exploit their experience with the electronic glossary to the fullest.

This preparatory information can take the form of introductory sessions wherein users are introduced to the glossing features and given practice sessions on how to consult the glossed entries. Watts (1997) suggests that training or tutorial sessions should have clear, concise, and useful descriptions of the program content. Instructors can also spend some time training students in how to use the electronic features most effectively.

Criteria for Selecting Words to be Glossed

The basis or criteria for selecting the words to be glossed is another important pedagogical consideration. In addition to not selecting too many words, as mentioned earlier, designers should avoid selecting words based on their intuitive sense or personal judgment. Instead, they should set some criteria which then can be used to guide their selections. Designers can choose between or combine two approaches, systematic selection or less systematic selection, for selecting the target words to be glossed. Systematic selection involves consulting or basing the selection on the available lists and frequency corpora (e.g., Francis & Kucera, 1982; Hindmarsh, 1980). Some words occur frequently while others appear only in specific contexts. Nation (1990) stated that overusing low-frequency words has a comical effect, and he proposed that attention be given to words according to their usefulness and importance to the text being read. Along the same line, Black et al. (1992) showed that readers see no point in looking up words that seem familiar to them, and therefore, they do not do so.

On the other hand, the second method--less systematic selection--entails asking representatives of the target user group to read the selected text and highlight all words that they do not know. This activity enables designers to measure pre-knowledge of the key words. Teachers of the target group can also be asked, based on their experience, to provide insight whether the target group would be familiar or unfamiliar with the selected words.

Proficiency Level of Learners and Context-Specific Definitions

Advance consideration should also be given to the proficiency levels of learners. The definitions provided need to be tailored to student proficiency levels and must be compatible with learners' abilities. The definitions should also be concise, include simple syntactical structures, and basic vocabulary. Additionally, the suggested definitions should fit the context of

the text in which the target words appear. Several researchers have found that the use of relevant definitions becomes a significant factor in what makes readers more willing to pay attention to word meaning, because readers will perceive that the definition helps them understand the text (e.g., Hulstijin, 1993; Hulstijin, Hollander, & Greidanus, 1996). According to Reinking (1990), one advantage of an electronic glossary over a traditional dictionary is that it provides immediate access to context-specific definitions. Context-specific definitions assure that readers do not need to determine which of the several dictionary meanings apply to a given context. Leffa (1992) echoed this argument and contended that context-specific definitions free readers from making a decision as to which definition entirely relates to the passage being read.

Accommodating Individual Differences

Another important aspect of electronic glossary design that requires considerable attention is the accommodation of individual differences. Each student brings a unique approach to learning experiences. Language educators continue to acknowledge the effect of individual differences on vocabulary learning due to the rapid advances in the application of instructional and educational technology (e.g., Chun, 2001; Plass, Chun, Mayer, & Leutner, 1998; Reinking, 1990). The technical capabilities of computer technology enable us to mediate an electronic glossary in an individualized fashion.

The accommodation of individual differences entails providing learners with different modes of learning based on individual needs and allowing them to choose their preferred mode of learning in order to derive meaning from the text under study. This ensures that the presentation of information is tailored to suit individual learners and particular situations. In this way, individual learners are given the opportunity to learn new vocabulary in their preferred mode of learning because their processing styles have been accommodated.

Accommodating individual differences can take the form of personalized adjunct aid acceding to the preferences and learning styles of the users. The program can provide options for selecting different types of dictionary information for each word, such as offering definitions in the target language, translation into L1, pronunciation, and verbal and visual explanations.

Assessment

There are a number of considerations which should be taken into account pertaining to the assessment of the learned lexical items offered in an electronic glossary. First, there should be a match between the mode of assessment and the way in which the vocabulary is presented. Second, the assessment exercises should not only remain at discrete-point level, that is, a level at which users check for matching items, provide correct responses in fill-in the-blank formats, and complete crossword puzzles. With the current capabilities of computers, assessment should provide opportunities to use the newly introduced vocabulary into new situations. The programmers can make use of notebooks and word-processing capabilities to pursue for novel, creative use of the newly acquired lexical items. These types of assessment exercises will offer multiple response types and are expected to produce more active learning while exploring and processing vocabulary from various modalities, including verbal (textual definitions) and nonverbal (static pictures, dynamic video, and animations).

Conclusion

This paper has attempted to inform L2 instructors and computer program developers of some vital technological and pedagogical considerations that need to be taken into account when designing an electronic glossary. The discussion has demonstrated that designing a technologically and pedagogically sound electronic glossary and incorporating the fullest exploratory capabilities of this medium entail bearing in mind the foregoing factors. The

proposed considerations were put forth in the hope of elucidating some essential factors that might provide direction toward a more effective medium for L2 vocabulary learning.

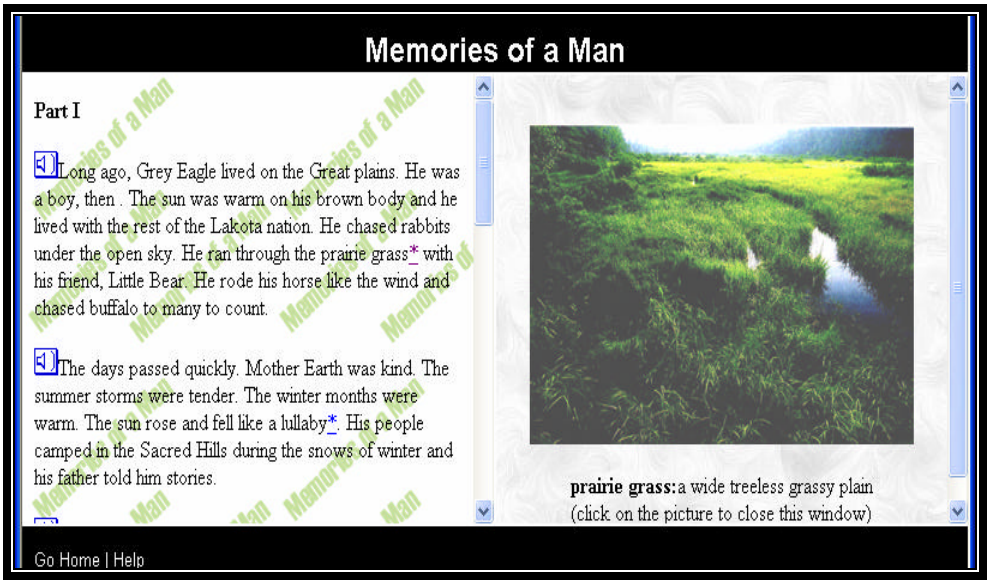

Figure 1.
Screenshot of a program designed by the author

The annotated words included in this program were marked with an asterisk (*). In order to look up a gloss, users click on the word, causing the annotations to appear on the right side of the screen.

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