# THE DESIGN OF AN ONLINE CONCORDANCING PROGRAM FOR TEACHING ABOUT REPORTING VERBS

**Joel Bloch**

**The Ohio State University**

This paper discusses the use of a web-based concordancing program using an interface design similar to the one used at the MICASE concordancing site to help students appropriately choose reporting verbs. Appropriate reporting verbs are important for asserting credible claims in academic papers. An interface was created that asked the students to make lexical, syntactic, and rhetorical choices based on a preset number of criteria related to the decisions writers make in choosing reporting verbs. Based on these choices, the interface could query a database of sentences that had been derived from a corpus of academic writing. The user would then be provided with a small sample of sentences using reporting verbs that matched the criteria that had been selected. The paper discusses how the assumptions about pedagogy for teaching about reporting verbs were incorporated into the design features of the interface and how the implementation of the concordancing site was integrated with the teaching of grammar and vocabulary in an L2 academic writing class.

## INTRODUCTION

Isabel Galloway (2005) has called corpus linguistics "the most significant development in applied linguistics in the last 25 years" (p. 333). Concordancing technology can provide researchers, teachers, and students with a rich tapestry of examples of specific linguistic elements embedded in a variety of rhetorical contexts. Concordancing can also help the user to construct meanings and usage patterns based on sentences or pieces of discourse collected from published or transcribed texts.

Early CALL software tended to mimic the approaches used in traditional grammar teaching that used artificial sentences with the student having to provide the correct answers, which could be checked by the program. However, ability to study syntactic and lexical items in authentic rhetorical contexts using concordancing can facilitate what Kolln (2007) calls "the marriage of grammar and rhetoric" (p. xi), which emphasizes how grammatical choice is influenced by rhetorical context, social constructive views of learning that emphasize the ability of learners to construct meaning for themselves (e.g., Shank & Cleary, 1995; Spivey, 1997), and connectivist views of learning that focus on how learners can use knowledge that is distributed outside the classroom, particularly on the Internet (Siemens, 2005).

Concordancing programs do not provide "correct" answers to queries about grammar and lexical questions but rather help create a learning environment where the user has to induce one appropriate answer from possibly many appropriate answers. As a result, concordancing programs not only provide a different role for grammar teachers but also a different approach for the learner. Learners must construct the best answers from the sample sentences without obtaining feedback on whether their answers are correct. Johns (1994) has called this process "data-driven learning." In this approach, the appropriate choices emerge (Hopper, 1987) out of the complexity of the rhetorical context in which they are found. In this way, the learner is engaged in the thinking processes underlying the creation of knowledge (Schank & Cleary, 1995).

This approach has made grammar teaching more about making appropriate choices and less about learning prescriptive rules. This shift, in turn, has changed the role of the teacher from being the expert in what is grammatically correct and what is incorrect to being a facilitator for creating a learning environment where the student has to reach decisions about appropriateness for themselves. Moreover,

 

the user evolves from being a consumer of rules to being a "detective" to discovering the answers to the questions they have posed.

Recently, there has been much research on how concordancing can be integrated into the classroom (Chambers, 2007, Cobb, 1997; Hewings & Hewings; 2002; Hunston, 2000; Hyland, 1998, 1999, 2001, 2002a; Lee & Swales, 2006; Stevens, 1991; Yoon, 2008; Yoon & Hirvela, 2004). Language teachers have found concordancing to be a useful means of creating materials for teaching vocabulary and syntax (Schmitt, 2000; Thurstun & Candlin, 1998). Hyland found that concordancing has been used in various ways in the L2 composition classroom: one is as a source of materials for teachers and a second as a tool for helping students understand inductively the rules and patterns of language and to raise their consciousness about patterns in writing.

Recently, there has been a growing interest in having students use concordancing programs to research their own questions about language use (Gaskell & Cobb, 2004; Lee & Swales, 2006; Stevens, 1991; Yoon, 2008; Yoon & Hirvela, 2004). This research has focused on language learners as a new and potentially larger group of users but who may have little or no experience in language research. While there is a general consensus that concordancing can be a valuable tool for these students, a number of these studies have reported that students sometimes experienced frustration with using the technology.

The responses of language students to the use of concordancing have been mixed. In her survey of the use of concordancing programs, Chambers (2007) found positive responses to the use of authentic materials and to the inductive nature of data-driven learning. Yoon and Hirvela (2004) found that students were sometimes frustrated both with learning to use the programs and with the occasional technological problems that inevitably occur. Vannestăl and Lindquist (2007) report on a student who stopped using the program and returned to using his grammar book because of the technical problems.

Researchers have found that students sometimes think that they could not understand all the examples or pick out the relevant examples (Kennedy & Miceli, 2001; Vannestăl & Lindquist, 2007). It was also apparent in this research that even when concordancing was successfully implemented, the teachers had to spend a great deal of class time incorporating concordancing programs into the class syllabus. The use of concordancing, therefore, "requires a great deal of time, support, patience, enthusiasm and reflection from the teacher" (Vannestăl & Lindquist, 2007, p. 344), which not every teacher has time for.

Chambers (2007) has called for new research in how concordancing, what she refers to as concordancing consultation, can be used to foster a learning environment that can help students overcome these kinds of problems. Such problems have created a basis for thinking about how the concordancing technology can be redesigned and implemented to respond to both the students' needs and the teachers' goals for using the technology for teaching grammar.

This paper examines one aspect of how a concordancing program was designed to guide learners through the process of choosing the appropriate use of reporting verbs in academic papers. Kennedy and Miceli (2001) have stressed the importance of guiding students, what is sometimes referred to as scaffolding, through concordancing activities to help them develop effective learning strategies. Reporting verbs are often used in academic papers to communicate both the nature of the activity reported and the attitude of the writer towards that activity (Hyland, 1999). Sakita (2002) discusses the reflexivity of reporting verbs; that is, how writers and speakers not only report and comment on claims but also criticize and question those same claims.

Using reporting verbs successfully for such a variety of purposes can require a precise understanding of the differences in meaning among reporting verbs, which can be difficult even for advanced English-language learners. In this paper, I will discuss the design of a web-based concordancing program that students could use to query a corpus of sentences containing examples of how reporting verbs are used in academic texts.

## THE DESIGN OF A CONCORDANCING WEBSITE

### The Nature of Concordancing Interfaces

Changes in the design of concordancing programs have greatly changed who could use the programs and how the programs could be used. The development of a number of web-based concordancing programs has greatly increased their availability to non-specialist users; however, they cannot be adapted by teachers or students to their specific needs. Relatively inexpensive PC-based concordancing programs, such as MonoConc 2.2 or Wordsmith allow teachers to design their own corpora to reflect their specific goals for teaching grammar. While these types of small corpora can provide more specialized forms of language (Aston, 2000) they cannot be easily accessed away from the computer on which they are installed.

Despite the limitations of relying on Internet access, such access has undoubtedly greatly increased the availability of concordancing to a wider variety of users with more varied needs and less expertise in language analysis. Web-based concordancing programs consist of a database holding a language corpus and a user interface for accessing the corpus according to a set of criteria that is coded into the architecture of the interface. An interface is what connects the user to the more complex code of the program being used.

This ability of the interface to affect usage is based on a simple assumption: The design of any technology is never neutral (Feenberg, 1999); that is, its design incorporates social, economic, or pedagogical concerns that affect its use, and all these concerns can affect the design and use of the interface. The design of an interface reflects a variety of assumptions about what the purpose of the program is, how it will be used, and who the intended audience is. *Collins Cobuild Sampler* , for example, requires its users to enter a variety of codes in order to access the corpus. The *View*, on the other hand, uses a drop-down menu from which the user can choose the part of speech of the word to be searched.

While the purposes of these programs may be similar, one interface might be more useable by novice users; another interface design might be more useable for one purpose than another. For example, the interface design used in MICASE (2003) contains a web-based interface that asks a number of questions in order to determine the sample of sentences that will be displayed. MICASE uses two general categories for these questions, speaker and speech event, and then a number of questions for each category. Each category provides a variety of choices, so the user simply has to click on a choice in each category, and based on their answers, the user will receive the target group of sentences. The answers to these questions are then used to query the corpus. In order to answer the questions, the user needs some understanding of differences in the types of discourse or in the use of language by different groups of people. On the other hand, the use of natural language, as opposed to entering codes as in Collins Cobuild, can make it more usable for some teachers and students.

Despite the greater accessibility of Internet-based concordancing programs, their interfaces cannot be modified by either teachers or users to meet their own goals. These limitations can motivate the design of new programs that better reflect the goals of the teachers and the needs of the students. Giving different types of users both greater access to a variety of programs as well as the ability to design their own programs reflects the recent evolution in thinking about how users should become more active participants in the development of materials for the World Wide Web, what is sometimes referred to as the read/write web or Web 2.0 (Berners-Lee, 1999; O'Reilly, 2005). From this perspective, the design of the Internet encourages the development of more concordancing programs designed not by large institutions such as publishers or universities but perhaps by individual teachers for specific and limited pedagogical goals. Some of these programs might be used by large numbers of people and some by only one class. By placing such programs on the Internet, nevertheless, every user can connect to the information found in them whenever they need to (Siemens, 2005).

### New Directions for the design of Specialized Concordancing Programs

The migration of concordancing programs to the Internet has resulted in a transformation of the technology from one that was only available to a few researchers into a tool that could be used by anyone with a computer and an Internet connection. Rather than been isolated in a proprietary environment, concordancing programs now can exist in a vast learning environment along with many other sources of information. Placing these sites in hyperlinked rhetorical environments also allows them to be directly linked to the students' papers or to other related websites, so they can be accessed whenever the user needs to.

Siemens (2005) has used the term connectivism to describe this kind of learning environment where different tools are available to the student at the moment they are needed. He argues that employing this connectivistic approach can facilitate the ability of students to learn new information by allowing them to construct their own networks. Students can access the information they need when they need it, for only the purpose they need, and from wherever they are located.

This approach can connect learning about grammar with using that knowledge in their writing. Early attempts to create programs that allowed this kind of cohesiveness encountered a variety of technical problems (Bloch & Brutt-Griffler, 2001), some of which were solved with the development of the "Comment" function in programs like Microsoft Word, which simplified how students can access the program. The comment function in Word allows readers to insert a comment that is linked to a specific piece of highlighted text.[1]

## THE DESIGN OF THE CORPORA AND USER-INTERFACE FOR TEACHING ABOUT REPORTING VERBS

The design or adaptation of any technology for specific classroom purposes, such as the teaching of grammar, always involves trade-offs. The design of web-based concordancing sites, for example, has raised concerns relating to the nature of the discourse contained in the corpora. Sites using large corpora often contain various forms of discourse that may give users a large sample of sentences but may not reflect the type of discourse found in those rhetorical contexts that the student is studying. MICASE (2003), for example, is limited to spoken forms found in various contexts.

In these concordancing programs, the types of discourse the user can access are controlled by the designers. However, in order to create tools for specific problems, teachers may have to bypass these gatekeepers by developing their own concordancing sites to reflect the pedagogical approaches they want to use, although they may not be able to use the kinds of large corpora other sites employ or have the technological ability to incorporate various features of the interface that these interfaces possess.

There are also cognitive demands related to the design of the interface that can be mitigating factors in how the program can be used. Gaskell and Cobb (2004) found that it was important to greatly increase the number of examples their students were exposed to, which, as mentioned before, larger corpora can readily provide. Aston (2000), on the other hand, has argued for smaller, more specialized corpora. For example, the number of sentences that are returned when an item is queried may be suitable for the language researcher who is skilled in focusing on the specific instances of what she is looking for, but disadvantageous to the learner who may not have the language skills to determine which examples are relevant and which are not. Providing too many examples to sort, as Osbourne (2000) argues, can also cause users to miss interesting examples of the target form.

Although many concordancing programs provide frequency data that is valuable for limiting the possible answers a search can generate, the frequency data alone does not address questions regarding what verb is the most appropriate for a particular rhetorical context. The pedagogical value of these web-based concordancing sites can depend on how the architecture of the interface mediates the relationship between

the user and the corpus of sentences to be queried. For example, the design strategy employed here is based on the research on learning objects (Wiley, 2001)[2]. A learning object is defined here as a narrowly based website containing educational materials that can be linked to other objects and websites. The URL of a learning object can be inserted into the students' papers as well as linked to other learning objects or websites.

This learning object was to be used for teaching about reporting verbs in a series of academic writing courses that were required of both graduate and undergraduate students. These courses stressed how students situate themselves and express their own identity in conjunction with the textual materials they must incorporate into their writing (Ivanič, 1998). The appropriate use of reporting verbs is a crucial factor in how writers report both their own claims and the claims of others.

One of the goals of the course was for students to learn the rhetorical purposes for using source texts, what is sometimes called textual borrowing or intertextuality (Ivanič, 1998). Ivanič has identified the use of intertextuality as a means for writers to establish their identities in their papers. Reporting verbs are one type of lexical item that help writers to establish this identity within their papers (Sakita, 2002).

The students' use of the learning object was reinforced by their classroom experiences, a relationship that can be crucial for the successful implementation of a technology (Bloch, 2007); therefore, the use of reporting verbs was introduced at the beginning course. The students were first given exercises to practice judging how reporting verbs were used in sentences chosen from the corpora using the categories featured in the interface. Then they practiced using the learning object to make choices about reporting verbs. Finally the students were asked to summarize articles related to their research using the reporting verbs they had discussed. For the remainder of the course, the students rewrote each draft of their critical review and research paper at least three times. On each draft, the instructor marked reporting verbs thought to be inappropriate. This inappropriateness could have been the result of syntactic problems, such as using a that-clause with a reporting verb that did not take that-clauses, or because of a judgment of semantic inappropriateness. For example in this sentence,

> WIKIPEDIA indicates that the first application of antenna was in the late 19th century

the instructor felt that the word *indicates* was too indirect to be used in this context. The instructor could then insert the URL of the learning object into a Comment box used in Microsoft Word so the student could directly access the program if desired. This process could be repeated each time the instructor felt there was a problem with the choice of a reporting verb.

**Corpus Design**

The first step in our design process was to create a database of sample sentences containing a variety of reporting verbs. Since sample articles from *Science* magazine had frequently been used in the course as examples of the assignments, sentences from research papers and critical reviews in this journal were chosen for two analogue corpora related to these two assignments (Tribble, 2002). *Science* (http://www.sciencemag.org), which is the journal of the American Association of the Advancement of Science, publishes articles in a variety of fields, primarily in the hard sciences but also in the social sciences and in technology, which reflected the fields in which most of the students were studying. Choosing a journal like *Science* would guarantee the quality of the texts used in the corpora as well as reflect the type of language the students were expected to use in their assignments. In addition, a third corpus based on student papers from previous sections of this class was also created in order to compare the distribution of the reporting verbs in student papers with the distribution in the *Science* corpora. Each corpus contained approximately 300,000 words. These three corpora were then combined into one large corpora.

MonoConc 2.2 was used to select possible sentences from this large corpus for inclusion into a single database. Within the framework of local intellectual property law[3], the corpora can be developed by

cutting and pasting a texts available on the Internet. These programs can then be used to search the corpora using specific lexical and syntactic items. For a small cost, these programs have given teachers the ability to develop small, narrowly defined corpora that match their specific goals for teaching grammar.

As discussed above, the optimum size of the corpora is one aspect of the design that has been highly contested. By greatly narrowing the functionality of the learning object to focus on reporting verbs, we could limit the number of examples to better reflect specificity of the language data for developing materials for grammar teaching (cf. Hyland, 2000b). As the designers of *MICASE* (2003) argued, the use of these kinds of specialized corpora can aid teachers in finding those syntactic and lexical patterns that diverge from what is often found in textbooks.

Another goal of the design was to limit the number of reporting verbs the student needed to choose from. Students often have problems understanding that each reporting verb can express a different attitude towards the claim being cited. Instead, they often seem to substitute one reporting verb for another. Therefore, it was hoped that there were enough examples to demonstrate these often subtle differences without overloading the students with too many possible choices. Initially, a list of 92 reporting verbs was chosen for possible inclusion. The lemma of each of the words was searched using *MonoConc 2.2,* and then, using the frequency count function, the 25 highest ranking reporting verbs were chosen. [4]

A search of the learner corpus yielded an additional two high frequency verbs that did not appear in the other corpora for a total of 27 reporting verbs. Since the corpora were not tagged for part of speech, it was necessary to go through the sample to eliminate those sentences where the target word was not used as a reporting verb. A random sample of 20 sentences was chosen for each target reporting verb for a total of 540 sentences[5] to be included in the corpus. However, there were inevitable tradeoffs with this approach. For example, providing only sentences containing the target reporting verb deprived the users of seeing the larger context in which the verb was used. On the other hand, it limited the amount of text the user needed to read, which could allow the user to process a larger number of sentences.

## Principles for the Design of a User Interface

The goal of the second aspect of the design process was to incorporate those design principles that were thought important into the interface of the learning object. Downes (2004) has identified a number of factors important in the design of any technology that seemed most relevant for our goals. Accessibility, simplicity, and functionality were considered to be the most important ones for developing the learning object. These principles are not meant to incorporate a universal theory of courseware design but to focus on those particular principles that were used for designing this learning object.

### *Accessibility*

Accessibility here refers to the various ways the program can be accessed. As Downes has argued, a technology needs to be available when the student needs it, not when the teacher wants to make it available. Useful technologies, such as telephones or cell phones, are available whenever they are needed (Downes, 2004). One of the primary goals for the interface to make it more useful was to be able to link it directly to the writing software the students were using (Bannan-Ritland, Dabbagh, & Murphy, 2001).

Unlike traditional handbooks where the student may have to go through a series of steps to find relevant information, the ability to add the URL of the site into a comment box made the accessibility of the program almost instantaneous. The modularity of the design also allows the site to be linked to other websites that deal with related topics. For example, in conjunction with the program on reporting verbs discussed here, another site was created that dealt with plagiarism (http://esl.osu.edu/staff/bloch/plagiarism), which contained exercises on paraphrasing that could be linked to the reporting verb site as well as discussions on various forms of plagiarism. In this way, information about the grammatical choices that writers make when citing sources could be connected with discussions

about the rules for the rhetorical use of reporting sources. This ability to insert the URL directly into the student paper can save the student time accessing the information, which could create a greater cohesiveness between the recognition of the problem and the ability to solve it.

***Simplicity***

The second principal used in designing the interface is that good technology should be simple. Downes (2004) argues that simplicity refers to both ease of use of a program and the ability of the program to do only what it needs to do. As has been discussed earlier, the greater accessibility provided by the Internet has increased the potential number of users who may have more diverse needs and backgrounds and therefore may require more user-friendly designs than students who have expertise in linguistic research. Many technologies that have been thought to be useful in education have failed because either the teachers or the students failed to understand the complexity of these technologies (Cuban, 2001). One such issue with language learners is the amount of time needed to train the students in using the program. Chambers (2007) found that much of the research has focused on enthusiastic teachers who spent a great deal of class time using the programs. The amount of time needed to train students may not be feasible in every composition classroom. Therefore, the design of the interface needed to be simplified.

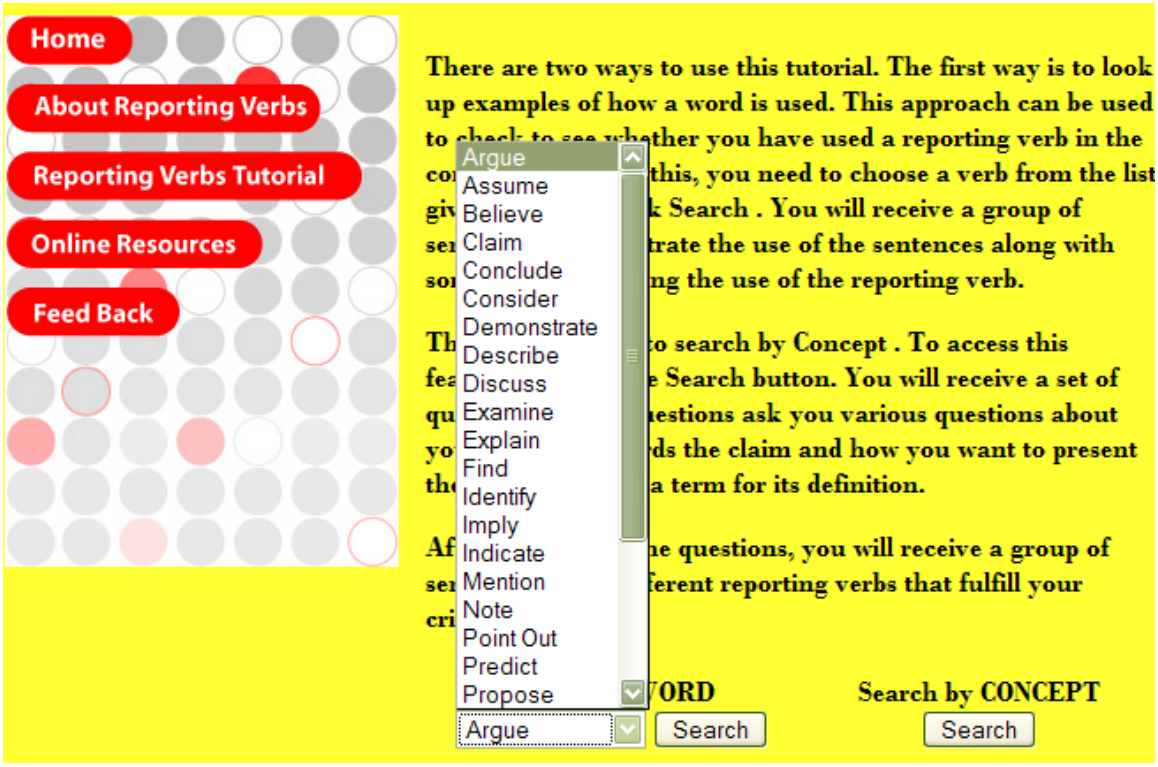


Figure 1. The pull down menu for querying the database for sample sentences.

One approach to simplifying the design was to eliminate the need for the user to create codes, similar to the approach MICASE uses. The interface discussed here provides two different choices for querying the website. The first choice is to choose a reporting verb from a pull down menu (Figure 1) and then the program provides the sample of sentences using this reporting verb (Figure 2). By reading through these sentences, which are provided five at a time, the writer can make a tentative hypothesis about the appropriateness of one or more reporting verbs and then use the sentences to try to verify their choice. As will be discussed later, the user is asked a series of questions about different aspects of reporting verb usage. Each feature (see below for a discussion of features) has a link to a window containing definitions,

explanations, and examples, of these features. Along with the discussion of these features during the class, it was hoped that this additional information could simplify some of the confusion discussed earlier.

### *Functionality*

Downes (2004) argues that good technologies should have clear functions that do exactly what the designer wants them to do. Functionality has always been a major consideration in the use of computer-aided language learning to help students solve their language problems on their own. The "tool" metaphor, which has often been employed for discussing the pedagogical value of technology in education (Levy, 1997), incorporates the concept of functionality in the design of a technology. Traditionally, the primary function of many computer-aided language learning applications has been to tutor students in standard classroom-based activities (Levy, 1997). Hyland (2002a), however, has used the informant metaphor to represent concordancing as a tool that provides a great deal of information that the users have to shift through and make decisions for themselves.

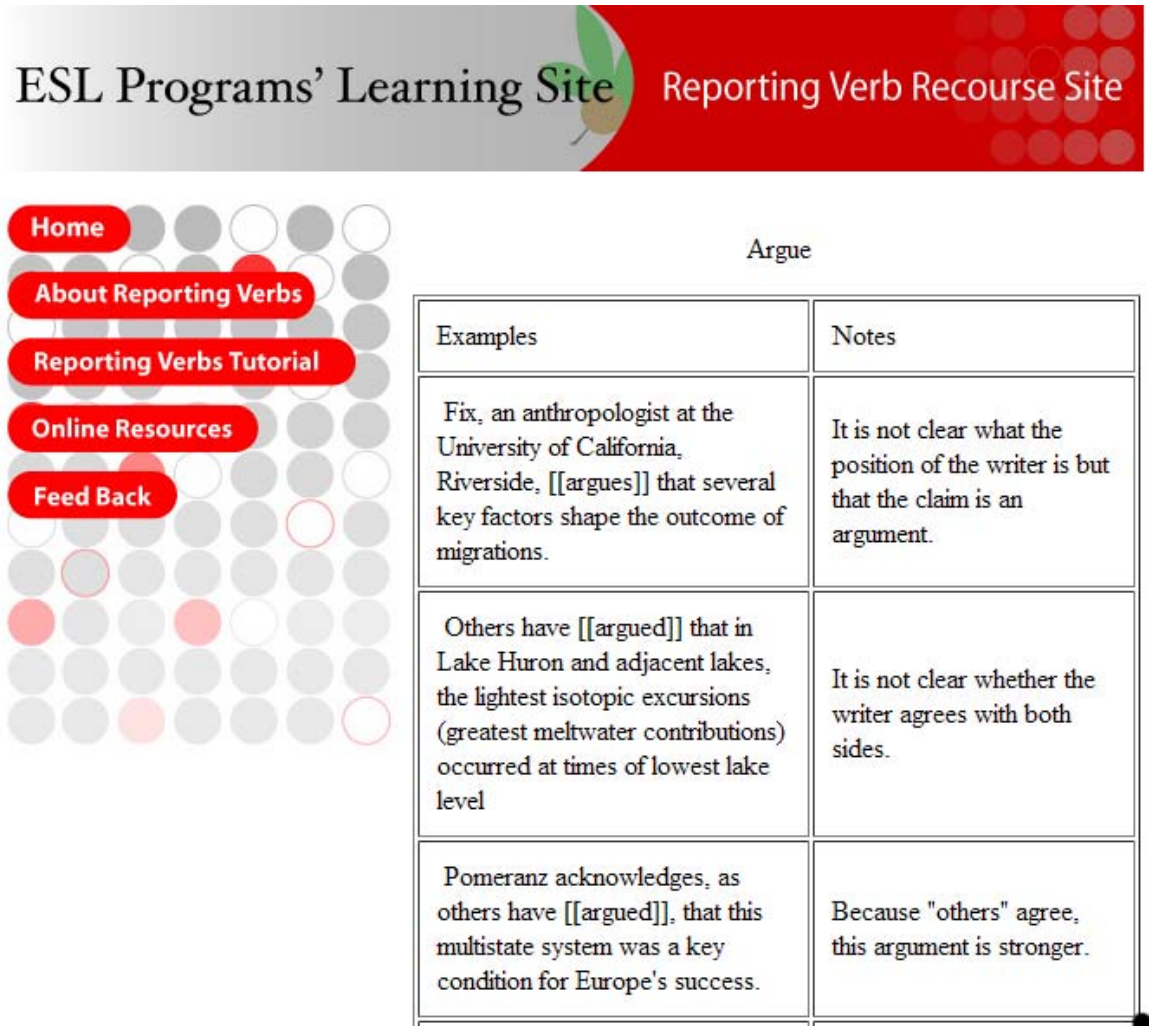


Figure 2. Sample sentences the user might receive from querying the word *argue*.

The primary function of the interface was to facilitate the process of data-driven learning by providing sample sentences that the student could use to induce the appropriate reporting verb for a given rhetorical context. The interface was therefore designed to facilitate this process by providing the users with a set of

criteria, as well as supplemental materials, that could help them model the decisions writers make when choosing a reporting verb. A secondary goal was to present learners with the kinds of decisions academic writers have to make when choosing a reporting verb. In this process, the interface design allowed students to walk through the decision-making processes that writers use in choosing reporting verbs (discussed in more detail below).

It has been argued that the search process itself can help students develop a greater metacognitive awareness of the forms that have been searched, which can be transferred to the students' future reading and writing experiences (Yoon, 2008). Raising the learners' consciousness about lexical and grammatical usage (Schmitt, 2000) could also help to develop their metacognitive understanding of the different criteria to consider when reporting information. In his study of the role of concordancing in helping students learn about connectives, Cresswell (2007) found some evidence of this metacognitive development in the students' understanding of the use of connectives.

To incorporate the functionality of Hyland's (2002a) informant metaphor into the design of the interface, we focused on two factors: its granularity and its ability to be hyperlinked. Wiley (2001) defines granularity as the degree to which the designer focuses on a single goal or on multiple goals. In this case, the learning object was limited solely to the use of reporting verbs.

**Think about the claim you want to make and then answer the following questions.**

Do you want an Integral or non Integral example?
**Integral**
**Non Integral**

Do you want an Informative or Descriptive example?
**Informative**
**Descriptive**

Do you want an example from the point of view of the author you are citing or yourself as the writer?
**Author**
**Writer**

You can express an attitude towards the truth of a claim:
(1) Positive (2) Negative (3) Unclear
**Positive**
**Negative**
**Unclear**

You can modify or hedge how strong that attitude is:
(1) Strong (2) Neutral (3) Weak.
**Strong**
**Moderate**
**Weak**

Figure 3. The screen the user sees for setting up a query of the corpus.

The program walks the students through the process of choosing a reporting verb by having the user answer a set of five questions in order to query the corpus. Before being introduced to the program, the students had discussed each of these questions in class and had practiced answering the questions using pen and paper exercises. The program would yield a sample of sentences that matched their criteria based

on the users answers to the questions (Figure 3). They then could read the set sentence and then choose a reporting verb to use in their paper, or they could refresh the screen and receive another set of five sentences and make a choice based on the sample sentences. Moreover, we could add additional grammatical information, such as a discussion about the use of tenses in the particular sentence, as well as other pages of information relating to the use of reporting verbs (Figure 4), much of which was also emphasized in the classroom.

The functionality of the learning object can also be increased by its ability to be used whenever the student needs help, what Wiley (2001) terms "reusability". As Downes (2004) puts it, such programs are always available and always on. By this measure, all concordancing programs are, in fact, reusable. This program could function as a 24/7 informant for information on reporting verbs each time the student needed it. Students could access our program whenever they needed help choosing a reporting verb. By allowing the user to make different choices about the criteria each time the program is accessed, the program can also be reused as often as necessary.

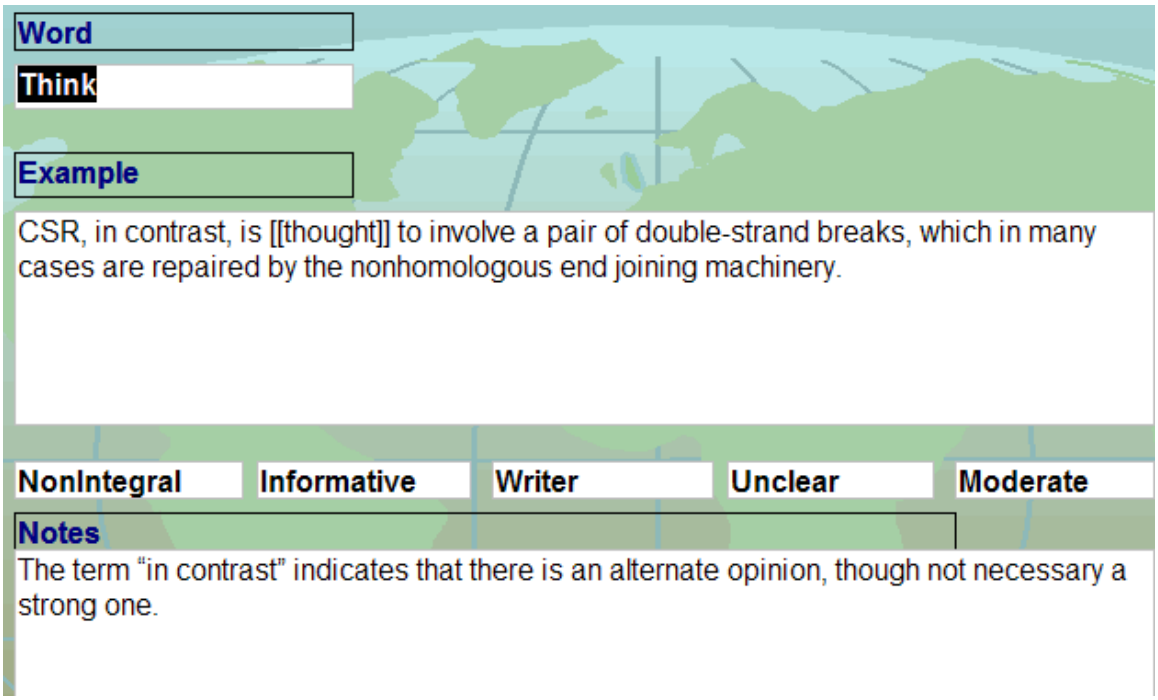


Figure 4. Sample entry including word, sample sentences, codes for each category, and notes.

Our previous experience with the course helped us to incorporate our concerns with how students made decisions about the use of reporting verbs into the design of the learning object. One problem our students frequently had was distinguishing between what are called descriptive reporting verbs (e.g., *describe*), which take an object or object clause, and an informative reporting verb (e.g., *argue*), which usually takes a *that*-clause complement. Therefore, the program could help the students decide whether their choice was syntactically correct by checking what complement each reporting verb could take. They could also attempt to verify the semantic appropriateness of their choice by reading through some or all of the sentences and then trying to induce the appropriate choice from the usages of the reporting verbs in the sample. This ability to learn by matching their hypothesis with authentic sentences is an essential quality of data-driven learning. Although this process does not guarantee finding a correct answer, it can provide the necessary scaffolding for helping students make appropriate choices.

These three factors that guided the design are all interrelated within the design to increase the functionality of the program. The ability to link the site directly to the students' texts, as well as to other

websites, not only simplifies its use but also can provide a greater functionality. As Haas (1996) has argued, integrating different technologies can have a transformative effect on their pedagogical potential. As has been discussed, the development of web-based interfaces has greatly expanded the functionality of concordancing programs in teaching grammar. The implementation of a program will inevitably foreground one pedagogical approach over another, which, in this case, emphasizes the integration of grammar and rhetorical context (Hopper, 1987).

## THE FINAL DESIGN OF THE LEARNING OBJECT

Interfaces are always designed to respond to the problems and backgrounds of their users. Based on the discussion above, there were four major goals the interface needed to address:

- The need to access the site from anywhere and at any time.
- The need to manage the number of sentences presented.
- The need to provide sentences that are representative of the kinds of issues that needed to be considered when choosing reporting verbs.
- The need to model the steps that writers employ in choosing a reporting verb.

In some ways, achieving the final goal within the design was the most critical. A database was created using Microsoft Access® to organize the sample sentences in the corpus in a way that allows these sentences to be queried according to a predetermined set of criteria. The categories used for querying were based on a variety of research on the use of reporting verbs in academic writing (Hunston, 2000; Hyland, 2002a; Swales & Freak, 2004; Sakita, 2002; Thompson & Tribble, 2001; Thompson & Ye, 1991). Five categories were selected (Figure 3)

- Integral/Nonintegral,
- Indicative/Informative,
- Writer/Author,
- Attitude toward claim, and
- Strength of attitude towards claim.

The first three categories were primarily based on Swales' (1990) research on citation use. The Integral/nonintegral distinction refers to whether the reference to the author of a claim appears within the sentence (*Integral*), which can include the author's name, or outside the sentence *(Nonintegral*), which can include either the name or a number referring to the reference list. The use of integral and nonintegral citations varies a great deal across disciplines (Thompson & Tribble, 2001), often reflecting the degree to which a discipline allows for personalizing a claim. The second category, *Descriptive/Informative* reflects a distinction Swales (1990) makes between sentences that provide a general overview of the research (*descriptive*) and sentences that contain a specific claim or piece of information is found (*informative*). The third category, *Writer/Author* refers to whether the claim is from the writer of the paper (*Writer*) or from the paper being cited (*Author*).

The final two categories are related to the rhetorical impact of the choice of claim. Latour (1988) argued that every instance of citation has some rhetorical purpose, including gaining support for claims and demonstrating how contradictory evidence must either be incorrect or not relevant to the current discussion. Sakita (2002) found that reporting verbs can be used to express an attitude or opinion concerning the claim, which Latour argued is important for developing the writer's voice or *ethos* within the paper. Therefore, the first category expressed whether the writer agrees with the claim or disagrees. The second category expressed the degree of such agreement or disagreement. For example, a writer can either agree and feel the claim is strongly substantiated or agree and feel that the claim still lacks substantiation. Finally the database contained a nonqueriable field called "Notes", which contained the additional information, such as on the tense of the verb.

Each sentence in the corpus was coded for each of the five criteria. The most problematic area for coding was deciding on the rhetorical purpose of the choice of reporting verbs. Identifying the rhetorical purpose of a citation is a problem in the field of citation analysis (Chubin & Moitra, 1975). In practice, both attitude and strength can be seen on a continuum from agree to disagree and from strong to weak, respectively. For this website, however, this had to be captured with only a limited number of subcategories. Therefore, it was decided for "Attitude," the subcategories were "Agree/Disagree/Unclear" and for "Strength," the subcategories were "Strong/Weak/Neutral."

## QUALITY ASSESSMENT

Since the introduction into the classroom of materials derived from concordancing programs, teachers and researchers have been interested in how students could use these materials (Chambers, 2007; Cobb, 1997). Our immediate goal was not to assess the overall effectiveness of the learning object on student writing ability but rather to better understand what the weaknesses in the program were, so we could adapt our classroom implementation in order to remediate these problems.

Therefore, we used a quality assessment approach to see where students were having problems using the learning object. Quality assessment is the process by which problems can be first identified and later eliminated by the developers of the program or discussed in the classroom. Our approach was to test whether an appropriate sample of sentences was returned according to the categories selected. This test was accomplished by running the program repeatedly and then checking the sentences in the sample. While this approach revealed a number of coding errors, we had to continually monitor the program to discover if there were more such errors.

Second, we wanted to see whether the students could use the learning object to make choices about the uses of reporting verbs and to correct inappropriately used verbs. Our first attempt at quality assessment revealed several issues related to the goals of the course and the different language levels of students. One such issue was the difficulty in comprehending the sentences. The most salient problem was the issue of specificity. Although the goal of the project was to provide students with authentic materials that contained localized features specific to their academic fields, we found that some students had trouble understanding the content of the sentence because of this level of specificity.

Incorporating sentences from an academic journal like *Science* reflects the argument by Hyland (2002b) for the importance of specificity in the design of materials for academic writing classes. However, having materials that are overly specific can make it difficult for some students to use these materials. User issues such as the amount of information received or technological considerations such as the size of the corpora can affect the overall usage patterns. Gaskell & Cobb (2004) found a great amount of variability in the effectiveness of concordancing, often depending on the language ability of the users. In our initial survey of the students, two-thirds of the users found that the sentences were easily understood, which meant, however, that one-third reported problems with understanding sentences. This problem raised questions about the optimum level of specificity in a corpus and which group of students could best use the learning object.

Further research in how the students used the learning object indicated other areas of promise and concern. The students were given a series of sentences from student papers with the reporting verb left out and then asked them to choose a more appropriate reporting verb than the one that had originally been used. A second test asked students to find an alternative reporting verb to the one given in a sentence taken from a student paper. This type of editing is often used in our classes for discussing grammar, so the students were familiar with this process. The goal here was to see how well the students could make the appropriate choice of a reporting verb from a limited sample of sentences. In these tests, 74% of their choices were judged by their instructors to be correct. The results indicated that most of students could use the program effectively. However, the number of sentences with a lower level of correct choices

indicated areas where the program warranted modification. Table 1 shows the results of a class exercise students in our lowest level writing class were given to test how well they could use the program to find the appropriate reporting verb. The sentences were taken from their papers, so they were familiar with the nature of the claims being made. In sentences 1-5, students were asked to fill in the missing reporting verb. In sentences 6-11, students were asked to correct the boldfaced verb. The instructor then decided whether their choice could be appropriate. For each sentence, there were a number of possible answers.

Table 1. Example Sentences of Students' Reporting Verb Choices

| **Sentences to revise** | **% of students judged to correctly revise** |
|---|---|
| 1. The author _____ that students _____ can get good grades by copying the work from the internet, but he _____ it will cause them a big trouble. | 92.59259 |
| 2. The teacher _____ copying a sentence from the internet without putting the author name is stealing. | 88.88889 |
| 3. Mrs. Lodge _____ that the punishment is too hard and the student needs not a punishment but education for that. | 77.77778 |
| 4. Heaton _____ a girl, named Haley Lodge who faced on a big problem because she put off writing a paper until the last day. | 74.07407 |
| 5. Heaton _____ that thanks to advancing technology and the use of the Internet, our youth today with the click of a mouse can find an answer to all their academic problems on the Internet. | 62.96296 |
| 6. Rose, the counselor, mentioned that it was clear that the writing was not all hers. | 81.48148 |
| 7. He indicated that the use of such these Websites is increasing, so students could easily get many sources from the sites. | 66.66667 |
| 8. The story indicates that what makes Marita accused of plagiarism by a graduate student is her plagiarizing of a book. | 77.77778 |
| 9. Rose describes she makes all selections which she copied from the library as her references. | 70.37037 |
| 10. The counselor discussed that Marita had been accused from her English teacher who handed her paper in to the director of Freshman English. | 81.48148 |
| 11. Rose described Marita had been accused of plagiarism by her English teacher who handed her paper in to the director of Freshman English. | 59.25926 |
| **Average** | **74.3827** |

One of the most frequent problems the students had in their writing was in judging whether a sentence was informative or indicative. In this example, which was taken from a student paper in a lower level writing course, the users were asked to find an alternative reporting verb.

Rose **described** that Marita had been accused of plagiarism by her English teacher.

In this example, the student used a that-clause with a reporting verb that was being used indicatively. When correcting this sentence 30% of the students incorrectly substituted a reporting verb that could not take a that-clause, indicating that the program could not always help them distinguish between indicative and informative claims.

It is difficult to fix these kinds of problems within the program beyond adding more information about the problem, although it could receive more focus in the classroom. The assessment also revealed problems students had judging whether their choice of reporting verb that fit the criteria was semantically appropriate for their own sentence. This problem, of course, is inherent in data driven learning where correct answers are not given.

Students also displayed some difficulty in understanding the semantic nature of the choices. For example, students often used *mention* to substitute for words like *state* or *write* that seem to reflect a straightforward reporting of information. In the following example sentence, the student used *mention* in a way that was felt to be inappropriate. In class, we had discussed how *mention* was often used to express a strong negative to indicate that the cited author did not discuss the topic in enough detail. When reporting their own claims, however, a writer sometimes did use *mention* to refer to what they themselves only briefly discussed. The negative attitude expressed in the use of *mention* had been difficult for the students to understand since this usage seemed to contradict commonly held assumptions.

> Heaton **mentions** a girl named Haley Lodge who faced a big problem because she put off writing a paper until the last day.

In this example, since the girl was the main topic of the paper, "mention" was not considered appropriate although it had appeared in the sample sentences. In our assessment, 81% of the students successfully corrected this usage. This kind of problem illustrates how concordancing software may give students unexpected results that contradict what they previously thought or had been taught (Thurston & Candlin, 1998).

Although we did not track the sets of sentences the students received, there were uses of *mention* that could fulfill the criteria the student had selected, although they were not necessarily appropriate in this particular sentence. The difficulty that some students had in matching the examples they received from the program with the problem in the sentence raised additional questions about how effectively students could use the program. This kind of problem with the use of the program raises questions that are beyond the scope of this paper about the general role of authority assumed in the concept of "data-driven learning." How well can students judge whether a sample of sentences that matches the criteria they imputed is, in fact, appropriate to the problem they are trying to solve. The possibility of these kinds of "false positive" results is an inevitable consequence of the students having to judge for themselves whether the answer is correct. However, these kinds of problems did help us better understand the issues that needed to be discussed more thoroughly in class throughout the course.

Since there is so much uncontrollable variability in how technologies are implemented, it may be difficult to generalize the results from one situation to another. As the often nasty debate over the value of explicit grammar teaching has shown (e.g., Ferris, 2004; Truscott, 1999), it is often difficult to control all the variables that affect the process of learning grammar, and therefore it is difficult to assess whether a particular approach, such as the one employed here, was effective in meeting the goals of the course. Nevertheless, based on this assessment, we modified both the design of the learning object and the way it was implemented. Our primary modification was changing how the learning object was introduced into the classroom and to integrate the discussion of reporting verbs usage into more aspects of the course. In future classes, we incorporated more pen and paper work with making choices about the use of reporting verbs before introducing the program into the class.

Our assessment of the learning object is ongoing, and more modifications will be made, which is an essential process in the use of any technology in the classroom.[6] Although the samples were small and therefore not statistically significant, the problems that were found are important for understanding possible limitations in the use of the technology and give direction to how these limitations may be remediated by increased classroom practice. As Gaskell and Cobb (2004) suggest, changing how students are introduced to the technology may help them become more effective users of it.

## CONCLUSION

The migration of concordancing to the Internet came at a time when there was a growing interest in contextualizing the teaching of grammar, creating what Micciche (2004) called a "discourse that takes seriously the connection between writing and thinking" (p. 718). The growing access to a variety of concordancing programs had given teachers, researchers, and material developers the ability to integrate authentic materials from specific rhetorical contexts in ways that reflected new theoretical and pedagogical developments on teaching grammar (Ellis, 2001). More recent changes in user interfaces have also allowed students to become more involved in using concordancing whenever they want and for whatever purpose they deem necessary. As Warschauer (2002) put it, technology can be a resource that can aid the student in critically reflecting on the "complicated" nature of language use, which was the ultimate goal in designing this learning object.

The ability to share information over the Internet, what Benkler (2006) calls "the wealth of networks," has also changed the social context of how students learn grammar and how teachers can interact in the teaching of grammar. The Internet provides the opportunity to share teaching materials and ideas on teaching reporting verbs with other teachers all over the world without the restrictions and costs that publishing textbooks entails. Such access allows students to use a teacher's materials after they leave the classroom as well as provide access to students the teacher has never met. As with other web-based technologies, this approach has potential for changing how we think about teaching. Benkler (2006) argues that the openness of the kinds of designs discussed here can itself facilitate the development of a new kind of social context for education. The ability to access grammatical information at the moment they need it can make it more convenient, and perhaps more useful, to engage in the process of "data-driven" learning whenever they need to. The use of concordancing in this way can be a step in achieving the long term goal of teachers to have students become autonomous learners of grammar both inside and outside the classroom (Chambers, 2007).

As with the use of any technology, the solution to the pedagogical problems inherent in the existing designs of concordancing interfaces involves modifying the architecture of the program. This paper attempted to demonstrate how modifying the interface of the program can address specific pedagogical problems a teacher wants to address. There were limitations to the design employed here, such as regarding how much context would be displayed for each example, an issue that should be the subject of further research.

Despite the limitations, it was hoped that this technology would help students not only make an appropriate choice of reporting verbs but also to understand how the choices of reporting verbs reflect an understanding of the rhetorical nature of the writing context and both the constraints and the possibilities of the genre in which they are working. Having students think through what position they are taking and how they think about the claims they are citing can help students reflect more about themselves as authors. Understanding that there may be several possible "correct" answers can also help the students to understand that writers make choices relating to their own opinions even when writing within the constraints of a particular genre of academic writing.

This discussion of using technology to teach grammar demonstrates a central point that is crucial to understanding how any technology can be used in the classroom: no technology is transparent regarding pedagogical practice nor is any technology deterministic in its effect on teaching practices (Haas & Neuwirth, 1994). There is always a "push-pull" effect between the inherent nature of a technology and the social context of the technology that makes every implementation unique: the technology affects the learning process, and the learning process affects both how the technology is designed and how it is implemented (Lessing, 1999). Similarly implicit in Johns' (1994) concept of data driven learning is the argument that the use of concordancing forces students to learn grammar in a different, more contextualized manner than is found in traditional grammar textbooks.

Finally, there is always the problem of obtaining proof that concordancing, in fact, can help the student writer learn to use a particular lexical or syntactic item. The argument that the introduction of concordancing has materially changed the environment for teaching grammar means that much of the previous research, especially the highly controversial issues concerning the effectiveness of grammar teaching, may not be the same, or perhaps as relevant, for grammar teaching in a technologically-enriched environment. Despite its limitations and controversies, we have found that concordancing can be of great value to our students, but, as with any technology, it must be constantly evaluated and modified in order to address the often changing problems with the use of the technology (Cobb, 1997).

## NOTES

1. Macros can be used to easily insert the URL into a comment box in Word, along with an explanation the instructor wants to provide.

2. For examples of learning objects, see Merlot (www.merlot.com) and Agora (agora.virtualmuseum.ca).

3. Intellectual property law varies around the world. It is difficult to know whether any given act violates a specific law unless there is clear legal precedence. In American law, the fact that there was no monetary gain or loss and the use for only for academic purposes could allow for this form of cutting and pasting to be legal under the fair use doctrine.

4. For the data used in the reporting verb learning object, see http://tinyurl.com/28pdqf**.**

5. While we based this on sentence units, we sometimes needed to create a larger context for interpreting the meaning of the verbs.

6. The learning object can be viewed at http://www.digitalunion.osu.edu/eslbloch/About_Reporting_Verbs.html.

## ACKNOWLEDGMENTS

I would like to thank The Office of Technology Enhanced Learning and Research (TELR) at The Ohio State University for providing technological assistance in developing the website discussed in this paper.

## ABOUT THE AUTHOR

Joel Bloch teaches ESL composition at The Ohio State University. He has a Phd in Rhetoric from Carnegie Mellon University and has published previously on Chinese rhetoric, academic discourse, blogging, contrastive rhetoric, and plagiarism. He is the author of *Technologies in the L2 Composition Classroom*, published by the University of Michigan Press.

E-mail: bloch10@yahoo.com

## REFERENCES

Aston, G. (2000). Corpora and language teaching. In L. Burnard & T. McEnery (Eds.), *Rethinking language pedagogy from a corpus perspective* (pp. 7-17). Frankfurt: Peter Lang.

Bannan-Ritland, B., Dabbagh, N., & Murphy, K. (2001) Learning object systems as constructivist learning environments: Related assumptions, theories, and applications. Retrieved January 19, 2007, from http://www.reusability.org/read/.

Barlow, M. (2004). MonoConc 2.2 [computer software]. Houston: Athelstan.

Benkler, Y. (2006). *The wealth of networks: How social production transforms markets and freedom*. New Haven, CT: Yale University Press.

Berners-Lee, T. (1999). *Weaving the Web: The original design and ultimate destiny of the World Wide Web*. New York: Harper Collins.

Bloch, J. (2007). *Technologies in the second language composition classroom*. Ann Arbor, MI: University of Michigan Press.

Bloch, J., & Brutt-Griffler, J. (2001). Implementing CommonSpace in the ESL composition classroom. In D. Belcher and A. Hirvela (Eds.), *Linking literacies: Perspectives on L2 reading-writing connections* (pp. 309-334). Ann Arbor, MI: University of Michigan Press.

Bolter, J.D., & Grusin, R. (1999). *Remediation: Understanding new media*. Cambridge, MA: MIT Press.

Chambers, A. (2007). Popularising corpus consultation by language learners and teachers. In E. H. Tenorio, L. Querada-Navarro, & J. Santana (Eds.), *Corpora in the foreign language classroom: Selected papers from the sixth international conference on teaching and learning corpora* (pp. 3-16). Amsterdam: Rodopi.

Chubin, D.E., & Moitra, S.D. (1975). Content analysis of references: Adjunct or alternative to citation counting. *Social Studies of Science*, *5(4)*, 423-441.

Cobb, T. (1997). Is there any measurable learning from hands-on concordancing? *System*, *25(3)*, 301-315.

Cresswell, A. (2007). Getting to 'know' connectors? Evaluating data-driven learning in a writing skills course. In E. H. Tenorio, L. Querada-Navarro, & J. Santana (Eds.), *Corpora in the foreign language classroom: Selected papers from the sixth international conference on teaching and learning corpora* (pp. 267-288). Amsterdam: Rodopi,

Cuban, L. (2001). *Oversold and underused: Computers in the classroom*. Cambridge, MA: Harvard University Press.

Downes, S. (2004). Nine rules for good technology. In *The learning marketplace: Meaning, metadata, and content syndication in the learning object economy* (pp. 11-15). Retrieved July 13, 2004, from http://www.downes.ca/files/book3.pdf.

Ellis, R. (2001). The place of grammar instruction in the second/foreign language curriculum. In E. Hinkle & S. Fotos (Eds.), *New perspectives on grammar teaching in second language classrooms* (pp. 17-34). Mahwah, NJ: Lawrence Erlbaum Associates.

Feenberg, A. (1999). *Questioning technology*. London: Routledge.

Ferris, D. R. (2004). The "grammar correction" debate in L2 writing: Where are we, and where do we go from here? (and what do we do in the meantime …?)**,** *Journal of Second Language Writing*, *13(1)*, 49-62

Galloway, I. (2005). Computer learner corpora and their pedagogical application. *TESOL Quarterly*, *39(2)*, 333-340.

Gaskell, D. & Cobb, T. (2004). Can learners use concordance feedback for writing errors? *System*, *32*, 301-319.

Haas, C. (1996). *Writing technology: Studies on the materiality of literacy.* Mahwah, NJ: Lawrence Erlbaum.

Haas, C., & Neuwirth, C.M. (1994). Writing the technology that writes us: Research on literacy and the shape of technology. In C.L. Selfe & S. Hillgross (Eds.) *Literacy and computers: The complications of teaching and leaning with technology* (pp. 319-335). New York: Modern Language Association of America.

Hewings, M., & Hewings, A. (2002). "It is interesting to note that…": A comparative study of anticipatory 'it' in student and published writing. *English for Specific Purposes*, *21(4)*, 367-383.

Hopper, P.J. (1987). Emergent grammar. *Berkeley Linguistics Society*, *13*, 139-157. Retrieved October 16, 2008 from http://home.eserver.org/hopper/emergence.html.

Hunston, S. (2000). Evaluation and the planes of discourse: Status and value in persuasive texts. In S. Hunston & G. Thompson (Eds.), *Evaluation in text: Authorial stance and the construction of* discourse (pp. 176-207). Oxford: Oxford University Press.

Hyland, K. (1998). *Hedging in scientific research articles.* Amsterdam: John Benjamins.

Hyland, K. (1999). Academic attribution: Citation and the construction of disciplinary knowledge. *Applied Linguistics*, *20(3)*, 341-367.

Hyland, K. (2001). Bringing in the reader: Addressee features in academic articles. *Written Communication*, *18(4)*, 549-574.

Hyland, K. (2002a). Activity and evaluation: Reporting practices in academic writing. In J. Flowerdew (Ed.), *Academic discourse* (pp. 115-130). Harlow, UK: Longman.

Hyland, K. (2002b). Specificity revisited: How far should we go now? *English for Specific Purposes, 21(4)*, 385-395.

Ivanič, R. (1998). *Writing and identity: The discoursal construction of identity in academic writing*. Amsterdam: John Benjamins.

Johns, T. (1991). From printout to handout. *ELR Journal*, *4*, 27-46.

Kennedy, C., & Miceli, T. (2001). An evaluation of intermediate students' approaches to corpus investigation. *Language Learning & Technology, 5*(3), 77-90.

Kolln, M. (2007). *Rhetorical grammar: Grammatical choice, rhetorical effects*. New York: Pearson.

Latour, B. (1988). *Science in action*. Cambridge, MA: Harvard University Press.

Lee, D., & Swales, J. (2006). A corpus-based EAP course for NNS doctoral students: Moving from specialized corpora to self-compiled corpora. *English for Specific Purposes*, *25(1)*, 56-75.

Lessing, L. (1999). *Code and other laws of cyberspace*. New York: Basic Books

Levy, M. (1997). *Computer assisted language learning*. Oxford: Clarendon Press.

MICASE (2007). Michigan Corpus of Academic Spoken English. Available at: http://quod.lib.umich.edu/cgi/c/corpus/corpus?c=micase;page=mbrowse.

Micciche, L. (2004). Making a case for rhetorical grammar. *College Composition and Communication*, *55(4)*, 716-737.

*The Michigan Corpus of Academic Spoken English: MICASE* (2002). Simpson, R. C; Briggs, J. Ovens S. L, & Swales. J. M. Ann Arbor, MI: The Regents of the University of Michigan. Retrieved August 11, 2004 from http://www.hti.umich.edu/m/micase.

O'Reilly, T. (2005). What is web 2.0: Design patterns and business models for the next generation of software. Retrieved December 3, 2005, from http://www.oreillynet.com/pub/a/oreilly/tim/news/2005/09/30/what-is-web-20.html?page=1.

Osbourne, J. (2000). What can students learn from a corpus? Building bridges between language and data. In L. Burnard & T. McEnery (Eds.), *Rethinking language pedagogy from a corpus perspective* (pp. 165-172). Frankfurt: Peter Lang.

Sakita, T.I. (2002). R*eporting discourse, tense, and cognition*. Amsterdam: Elsevier.

Schmitt, N. (2000). *Vocabulary in language teaching*. New York: Cambridge University Press.

Scott, M. (n.d.) Oxford WordSmith Tools Version 4.0 [computer software]. Cambridge: Oxford University Press.

Shank, R.C., & Cleary, C. (1995). *Engines for education*. Hillsdale, NJ: Lawrence Erlbaum.

Siemens, G. (2005). Connectivism: A learning theory for the digital age,. *International Journal of Instructional Technology & Distance Learning, 2*(1). Retrieved May 31, 2008, from http://www.itdl.org/Journal/Jan_05/article01.htm.

Spivey, N.N. (1997). *The constructivist metaphor: Reading, writing, and the making of meaning*. San Diego: Academic Press.

Stevens, V. (1991). Classroom concordancing: Vocabulary materials derived from relevant, authentic text. *English for Special Purposes Journal, 10(1)*, 35-46.

Swales, J. (1990). *Genre analysis: English in academic and research settings*. Cambridge: Cambridge University Press.

Swales, J. M., & Feak, C. B. (2004). *Academic writing for graduate students: Essential skills and tasks, 2nd Edition*. Ann Arbor, MI: The University of Michigan Press.

Thompson, G. & Ye, Y.Y. (1991). Evaluation in reporting verbs used in academic papers. *Applied Linguistics*, *12(4)*, 365-382.

Thompson P., & Tribble, C. (2001). Looking at citations: Using corpora in English for academic purposes. *Language Learning & Technology*, 5(3), 91-105. Retrieved December 2, 2008, from http://llt.msu.edu/vol5num3/thompson/default.html.

Thurstun, J., & Candlin, C.N. (1998). Concordancing and the teaching of the vocabulary of academic English. *English for Specific Purposes*, *17(3)*, 267-280.

Tribble, C. (2002). Corpora and corpus analysis: New windows on academic writing. In J. Flowerdew (Ed.), *Academic Discourse* (pp. 131-149). Harlow, UK: Longman.

Truscott, J. (1999). The case for "The case against grammar correction in L2 writing classes": A response to Ferris. *Journal of Second Language Writing*, *8*, 111-122.

Vannestăl, M.E., & Lindquist, H. (2007). Learning English grammar with a corpus: Experimenting with concordancing in a university grammar course. *Recall*, *19*, 329-350.

Warschauer, M. (2002). Networking into academic discourse. *Journal of English for Academic Purposes*, *1*, 45-58.

Wiley, D. (2001). Connecting learning objects to instructional design theory: A definition, a metaphor, and a taxonomy. In D. Wiley (Ed.), *The instructional uses of learning objects* (online version). Retrieved December 2, 2008, from http://reusability.org/read.

WordPilot (n.d.). [computer software]. Hong Kong: Compulang. Retrieved October 18, 2008, from http://home.ust.hk/~autolang/download_WP.htm.

Yoon, H. (2008). More than a linguistic reference: The influence of corpus technology on L2 academic writing. *Language Learning & Technology*, *12(2)*, 31-48.

Yoon, H. & Hirvela, A. (2004). ESL student attitudes toward corpus use in L2 writing. *Journal of Second Language Writing*, *13(4)*, 257-283.