Help Options in CALL: A Systematic Review

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ABSTRACT
This paper is a systematic review of research investigating help options in the different language skills in computer-assisted language learning (CALL). In this review, emerging themes along with issues affecting help option research are identified and discussed. We argue that help options in CALL are application resources that do not only seem to assist second language learners in performing tasks but also to support language learning. We also argue that in addition to situating help options within the interactionist theory in second language acquisition (SLA), help options could be examined through the lenses of sociocultural theory. The examination of help options from disciplines related to CALL allows for further understanding of how various approaches to research can be used to inform help option conceptualization and their development in CALL-based materials.

KEYWORDS
Enhanced Input in CALL, Help Options, Learner-Computer Interaction

INTRODUCTION
Throughout the years, assistance has been explored in CALL research under several different names: ‘help facilities’ (Pujolà, 2002; Grgurović & Hegelheimer, 2007), ‘guidance support features’ (Hegelheimer & Tower, 2004), ‘help aids’ (Cárdenas-Claros, 2005; Grace, 2000), and ‘multimedia support resources’ (Chun, 2001). Here, we prefer to use the term ‘help options’ to acknowledge the point that learners require a certain level of autonomy to decide if, when, and how they may wish to utilize assistance. To us, ‘help options’ are embedded application resources that assist learners in performing computing operations and/or support language learning. In our way of thinking, features such as annotations, hints, and glosses can be seen as types of help options.

One significant benefit of well designed CALL materials is to have enhanced input available to learners on demand. Effective enhancements, operationalized as help options, can reduce frustration in the use of technology, immediately correct flawed understandings, draw attention to specific linguistic features, and ease the demands of second language processing. Despite such potential benefits, however, learners tend to neglect or ignore the use of help options. Why? How can CALL learners make more use of help options? How can we as language educators help create more effective software solutions?

In this paper, we seek to clarify how help options are used, ways they have been investigated, and where to place them within the framework of second language acquisition (SLA) theory. This understanding, in turn, may provide researchers with parameters to determine how help options can better be conceptualized, developed, and evaluated. To achieve this aim, we first describe how research in areas related to CALL can inform our current view of help options. We then turn our attention to exploring issues that affect help option research.
Next, we situate help options within the interactionist perspective of SLA theory and explore the hypothesized benefits of learner-computer interaction (Chapelle, 2003). At the conclusion, we propose ways to further examine CALL help options.

AN OVERVIEW OF HELP OPTIONS
Help is an important part of any computer environment (Sampson, 2007). Although readily available in most applications, help is nonetheless a component separate from the central application and thus requires users to momentarily abandon a task to gain assistance (Ellison, 2007). Such moves negatively influence help-seeking frequency (Dworman & Rosenbaum, 2004).

Several researchers have attempted to identify reasons for the paucity of help use. Kelleher and Pausch (2005), for instance, saw one possible explanation as the user’s inability to locate sources of help in an application. Dworman and Rosenbaum (2004) noted that users often had cognitive blind spots, or an inability to see help even when it was displayed in front of them. The researchers also discovered distraction aversion—a reluctance of users to leave a task to look for assistance—as well as a fear to “suffer potentially dire consequences to leave their tasks” (p. 1717). Another possible cause, refusal to admit defeat, highlighted the users’ tendency to think that they could figure out a solution without a need for assistance.

After constructing an instrument to measure software support, Willis (2006) concluded that help system mechanism design “does not support the natural help seeking behaviors of human beings” (p. 435). One of the ways that designers are encouraging the use of help, however, is to embed it into applications so that assistance is offered at the right moment; in this manner, it does not keep users away from a task and thus increases the chances for successful task completion (Ellison, 2007; Hughes, 2007; Sampson, 2007).

Help functions are believed to hold a great potential for learning in interactive learning environments (Aleven & Koedinger, 2000; Aleven, Stahl, Schworm, Fischer & Wallace, 2003; Aleven, McLaren, Roll, & Koedinger, 2004; Bartholomé, Stahl & Bromme, 2004). One recurrent puzzle, however, is that help options are little used or ignored by most learners. In a comprehensive review of help, Aleven et al. (2003) looked at a number of factors that may contribute to nonuse. Significantly, they found that complex combinations of instructional goals, learner characteristics, and design factors each impinge on the effectiveness of help.

Moving from theory into practice, Aleven et al. (2004) tested help-seeking behavior through the use of agent-oriented software. In a pilot study, they found that 72% of all student actions represented unproductive help-seeking behaviors. These actions included students’ overuse of hints to find answers rather than trying to understand, as well as students’ lack of use of help when it was likely to be of benefit. Although Aleven et al. pointed out that their help-seeking model needed refinement, they were positive that the design was heading in the right direction. Importantly, too, the researchers underscored the need for learner instruction on the use of help as a key factor.

HELP OPTIONS IN CALL
Help options in CALL have been researched in each language skill, but most studies have examined reading and vocabulary, with fewer instances in listening, grammar, and writing.
**Help Options in Reading Comprehension and Vocabulary Acquisition**

In computer-based reading, the way help options allow click-away-access to translations, verbal and/or pictorial definitions, and explanation of unknown words “compensates for insufficiently automatic lower level processes and thus allows the reader to attend to higher level processes” (Chun, 2006, p. 70). Studies can be placed in one of three categories: (a) effectiveness of use of annotations, glosses, and dictionaries; (b) effects of visible and invisible links; and (c) look-up behavior and learning variables.

**Effectiveness of use of annotations, glosses and dictionaries**

Researchers investigating the effectiveness of annotations have investigated, for example, the effects of visuals in vocabulary acquisition and reading comprehension (Al-Seghayer, 2001; Chun & Plass, 1996; Yoshii, 2006). Collectively, they tend to agree that the use of visuals, particularly when combined with text, positively affects second language reading comprehension.

Effectiveness of different types of glosses has also been investigated (Yeh & Wang, 2003; Yoshii & Flaitz, 2002). As with annotations, such research tends to show that looking up a combination of translations and still pictures results in better learning of lexical items than looking up translations alone. Using online dictionaries, Laufer and Hill (2000) investigated the relationship between the type of information selected in a word (English definition, translated equivalents, sound, root, and ‘extra’ information) and word retention. They found that the use of multiple information presented in a dictionary appears to reinforce the retention of lexical items. Chun (2001) compared the effectiveness of students’ access to translations provided by two types of links, internal (glossary) and external (online dictionary) and found that learners tended to access the internal glossary more frequently than the external dictionary. Peters (2007) examined how look-up behavior can be manipulated for dictionary use by looking at the effects of test announcement and word relevance and found that many dictionary look-ups can be motivated by foreshadowing assessment tasks (see Table 1).

<table>
<thead>
<tr>
<th>Study</th>
<th>Issues</th>
<th>Help options</th>
<th>Data collection</th>
<th>No.</th>
<th>L2</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chun &amp; Plass (1996)</td>
<td>Look-up behavior &amp; effectiveness of two types of annotations</td>
<td>Visual annotations: pictures &amp; video versus verbal annotations: definitions &amp; explanations</td>
<td>Tracking system</td>
<td>161</td>
<td>German</td>
<td>Dynamic visual organizers aided in the comprehension of L2 texts. The combination of visual &amp; verbal annotations helped more in the comprehension of L2 texts than verbal annotations only.</td>
</tr>
<tr>
<td>Yoshii (2006)</td>
<td>Effectiveness of glosses use</td>
<td>Annotations: translation &amp; pictures; definitions &amp; pictures</td>
<td>Tracking system</td>
<td>195</td>
<td>EFL</td>
<td>L1 (translations) &amp; L2 (definitions) were effective for incidental vocabulary learning.</td>
</tr>
</tbody>
</table>
### Help Options in CALL

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Yeh &amp; Wang (2003)</td>
<td>Effectiveness of three types of multimedia glosses: text only; text &amp; picture; &amp; text, picture, &amp; sound</td>
<td>Glossed words: text only; text &amp; picture; &amp; combination of text, sound, &amp; picture</td>
<td>Tracking system</td>
<td>82</td>
<td>ESL</td>
<td>Students who accessed annotations with the combination of text &amp; picture outperformed those who accessed text only &amp; combination of text, audio, &amp; picture annotations.</td>
</tr>
<tr>
<td>Yoshii &amp; Flaitz (2002)</td>
<td>Effectiveness of different types of glosses</td>
<td>Glossed words: L2 definitions only, picture only, &amp; the combination of L2 &amp; pictures</td>
<td>Tracking systems</td>
<td>151</td>
<td>EFL</td>
<td>Students who had access to the combination of still pictures &amp; translations outperformed other students in vocabulary acquisition measures.</td>
</tr>
<tr>
<td>Chun (2001)</td>
<td>Relationship of look up behavior &amp; proficiency level</td>
<td>Internal glossary versus external dictionary</td>
<td>Tracking system</td>
<td>23</td>
<td>German</td>
<td>Learners performed better on measure of comprehension when accessing internal &amp; external dictionary</td>
</tr>
<tr>
<td>Peters (2007)</td>
<td>Effects of test announcement &amp; word relevance in dictionary use &amp; word retention</td>
<td>Dictionary</td>
<td>Tracking system</td>
<td>84</td>
<td>German</td>
<td>Manipulation of look-ups could be achieved by forewarning students of vocabulary tests. However, vocabulary test announcement had an effect on learner’s noticing of a target word, but this noticing did not affect word retention.</td>
</tr>
</tbody>
</table>

### Effectiveness of visible and nonvisible links

De Ridder (2002) found that the use of visible links contributed to incidental vocabulary learning and did not decrease comprehension of the text or slow down the reading process. Nikolova (2004) found that the performance of average-achieving students was positively influenced by the increased use of visible link look-ups, reaching levels of performance comparable to those of high-achieving students (see Table 2).

**Table 2**

<table>
<thead>
<tr>
<th>Study</th>
<th>Issues</th>
<th>Help options</th>
<th>Data collection</th>
<th>No.</th>
<th>L2</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>De Ridder (2000)</td>
<td>Effects of visible &amp; invisible links in word retention &amp; reading comprehension</td>
<td>Visible &amp; invisible links</td>
<td>Tracking system</td>
<td>60</td>
<td>French</td>
<td>Visible links prompted more clicks than invisible links. The use of visible links did not reduce comprehension or slow reading. Visible links led to better vocabulary retention but had no effect in reading comprehension.</td>
</tr>
</tbody>
</table>
Look-up behavior and learner variables

Research on look-up behavior and learner variables is crucial because it takes the end-user, specifically the second language learner, as the object of examination. Chun (2001) investigated the relationship between look-up behavior and proficiency level and found that average achievers accessed both internal glossaries and external dictionaries more than high achievers. Interaction with the multimedia support resources, Chun suggested, may strengthen the performance results of average learners to a level similar to that of high achievers.

Gender differences and use of annotations is another aspect investigated in learner variables. Grace (1998, 2000) examined whether access to L1 translations affected the performance of 181 volunteer French learners when taking receptive vocabulary tests. Participants were randomly assigned to one of the two treatments: (a) access to translations and (b) nonaccess to translations. Grace reported that when students were given multiple-choice bilingual tests, there were no significant differences between female or male participants either in the short-term or the long-term tests or in the frequency of use of translations.

Working memory capacity and look-up behavior is another area of research. Chun and Payne (2004) showed how phonological working memory (PWM) capacity relates to reading comprehension and vocabulary acquisition in an annotation-rich multimedia environment. They found that students who used annotations more frequently tended to have lower PWM. They also reported that reading comprehension test scores were similar for students who used help options and those who did not use them (see Table 3).

Table 3
Look-up Behavior and Learner Variables

<table>
<thead>
<tr>
<th>Study</th>
<th>Issues</th>
<th>Help options</th>
<th>Data collection</th>
<th>No. L2</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nikolova (2004)</td>
<td>Proficiency level &amp; effects of visible &amp; invisible links</td>
<td>Visible &amp; invisible links</td>
<td>Tracking system</td>
<td>264</td>
<td>French Vis French Average achievers benefited more from accessing visible links than high achievers.</td>
</tr>
<tr>
<td>Chun &amp; Payne (2004)</td>
<td>Working memory capacity &amp; look-up behavior</td>
<td>Verbal annotations: translations versus no annotations</td>
<td>Tracking system</td>
<td>13 German</td>
<td>Students who used annotations more frequently tended to have lower phonological working memory capacity. English annotations were looked up more frequently than German ones.</td>
</tr>
</tbody>
</table>
Help Options in Listening Comprehension

In this section, we present the studies in four categories: (a) help options use versus nonuse, (b) student attitudes toward help option use, (c) frequency of help option use and performance, and (d) help options and learner variables.

Help option use and nonuse

Jones and Plass (2002) investigated the use of pictorial and verbal annotations in vocabulary acquisition and found that students who looked up both written and pictorial annotations remembered word translations and recalled the passage better than students who looked up only one of the types or no annotations. In delayed tests, pictorial annotations seemed to have a stronger effect in helping students remember the vocabulary items and the passage. Jones and Plass suggested that their findings may extend Mayer’s (2001) generative theory of multimedia learning. For Mayer, learning is improved when (a) students select visual or verbal information in a multimedia environment, (b) separately organize the visual and verbal information into coherent representations, and (c) integrate these two mental representations to establish referential connections that may then be integrated into a new mental model.

Students’ attitude toward help option use

In a study of perceived effectiveness of help option use, Liou (2000) found that learners preferred applications with more modes of input rather than those with fewer modes of input. Jones (2003) investigated students’ attitudes towards working with multimedia activities in which different types of annotations were available to students as they processed an aural passage. Overall, learners who selected both visual and verbal annotations tended to remember word translations and recalled the passage better than those learners who did not have access to annotations. In addition, students believed that having the ability to process aural materials aided by annotations was very helpful for the comprehension of aural texts and the acquisition of vocabulary.

<table>
<thead>
<tr>
<th>Study</th>
<th>Issues</th>
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<th>Data collection</th>
<th>No.</th>
<th>L2</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liou (2000)</td>
<td>Perceived effectiveness of help option use</td>
<td>English &amp; Chinese script, gist, background information, vocabulary, pause &amp; backward buttons</td>
<td>Tracking systems &amp; oral interviews</td>
<td>20</td>
<td>ESL</td>
<td>Input with more modes was preferred by learners. Therefore, it was used more often. Re-access of input with larger units was preferred to input with smaller units. The backward button was more frequently used than pause or replay buttons.</td>
</tr>
<tr>
<td>Jones (2003)</td>
<td>Students’ attitudes working with a multimedia environment</td>
<td>Annotations: textual (translation) &amp; visual (pictures)</td>
<td>Tracking system &amp; interviews</td>
<td>20</td>
<td>French</td>
<td>The combination of visual &amp; written annotations assisted learners in the comprehension of aural passages &amp; in the retention of vocabulary. Learners found the interaction with annotations useful.</td>
</tr>
</tbody>
</table>
Frequency of use of help options and performance in listening comprehension

As in Hsu (1994) and Liou (1997), Pujolà (2002) examined frequency, patterns, and strategies of help facility use in a web-based multimedia application. Although Pujolà found that decoders at differing levels of proficiency behaved in various ways, the study concluded that there was no clear correlation between the use of help options and proficiency level.

In a controlled investigation, Hegelheimer and Tower (2004) designed computer-based materials that constricted help options. In this study, learners had five options: (a) microphone button, (b) headphone button (played recording made by the user), (c) repeat button (sound only), (d) ABC button (sound and text), and (e) glossary. The researchers found that help option use was a better predictor of performance than the time spent using the software. Moreover, Hegelheimer and Tower found that textual glosses and simultaneous repetition of text and audio were either infrequently used or completely ignored by half of the students. They also noted that although low proficiency students tended to request dual input more frequently than high proficiency students, they appeared less likely to utilize it effectively.

A more recent study examined the behavior and performance of students when using a CALL multimedia listening activity that offered two types of textual help in the form of transcripts and subtitles (Grgurović & Hegelheimer, 2007). The results showed that participants varied in their use of help options in terms of help, number of page openings, and number of instances of useful interaction. In addition, differences between the two proficiency groups were found in performance during and after the activity as higher proficiency students exhibited a much better comprehension of the learning materials (see Table 5).

Table 5
Frequency of Use and Performance in Listening Comprehension

<table>
<thead>
<tr>
<th>Study</th>
<th>Issues</th>
<th>Help options</th>
<th>Data collection</th>
<th>No.</th>
<th>L2</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hsu (1994)</td>
<td>Aural repetition, transcripts, &amp; dictionary</td>
<td>Tracking systems &amp; oral interviews</td>
<td>15 ESL</td>
<td></td>
<td></td>
<td>Transcripts were more frequently accessed by learners followed by the aural repetition &amp; the dictionary. Students perceived transcripts to be the most useful tool. Help requests positively correlated with aural comprehension.</td>
</tr>
<tr>
<td>Liou (1997)</td>
<td>Help option use &amp; performance</td>
<td>English &amp; Chinese scripts, gist, background info, idioms, &amp; word search function</td>
<td>Tracking systems &amp; oral interviews</td>
<td>20</td>
<td>ESL</td>
<td>Effective learners were less likely to seek help &amp; mostly used the English script, the replay function, &amp; the Chinese script.</td>
</tr>
<tr>
<td>Pujolà (2002)</td>
<td>Frequency of use of help options, patterns of use, &amp; strategies used by participants</td>
<td>Cultural notes, transcripts, subtitles, dictionary, expert module, video control feedback</td>
<td>Screen capturing device, direct observation, &amp; interviews</td>
<td>22</td>
<td>EFL</td>
<td>No correlation between help option use &amp; participant’s proficiency level was found. Learners behaved in varied idiosyncratic ways; difficult to draw global conclusions.</td>
</tr>
<tr>
<td>Hegelheimer &amp; Tower (2004)</td>
<td>Frequency of help option use &amp; performance</td>
<td>Microphone button, headphone button, repeat button, ABC button, &amp; glossary</td>
<td>Records Manager feature embedded in the program</td>
<td>90</td>
<td>EFL</td>
<td>Help option use was better predictor of performance than time spent with the software. Textual glosses &amp; repetitions of text &amp; audio were underused or ignored.</td>
</tr>
</tbody>
</table>
 Clearly, varied results on the relationship between help option use and performance (positive relationship in Jones, 2003; Jones & Plass, 2002; Grgurović & Hegelheimer, 2007; no relationship in Liou, 1997, 2000; Pujolà, 2002; negative relationship in Hegelheimer & Tower, 2004) point to the need for further research in help option usage in listening environments.

**Help option use and learner variables in listening comprehension**

Hoven (2003) observed variations between students of differing levels of proficiency. Hoven found that students’ attitudes towards the language program changed as they became more familiar working with it. Hoven also found that high-proficiency learners tended to use help options more frequently throughout the semester, whereas mid- and low-proficiency learners tended to rely on assistance immediately before testing took place.

Cárdenas-Claros (2005) examined help options from the perspective of the cognitive style of field dependence/independence through a questionnaire and the Group Embedded Figures Test (a perceptual test in which students are asked locate and trace a simple figure embedded into a more complex one, see Witkin, Olman, & Raskin, 1971). Cárdenas-Claros found that performance in web-based listening activities did not correlate to measures of cognitive style. Field-dependent learners, however, tended to use transcripts more frequently; field-independent learners, on the other hand, generally used the dictionary. Jones (2006) found that learners who worked with the combination of visual and verbal annotations, either alone or in pairs, did better in translating words or recognizing words than learners who had no access to annotations. However, learners who had access to annotations and worked collaboratively had better results on the recall measures than students who also had access to annotations but who worked independently (see Table 6).

**Table 6**

**Help Option Use and Learner Variables**

<table>
<thead>
<tr>
<th>Study</th>
<th>Issues</th>
<th>Help options</th>
<th>Data collection</th>
<th>No.</th>
<th>L2</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grgurović &amp; Hegelheimer (2007)</td>
<td>Behavior &amp; performance of students using transcripts &amp; subtitles</td>
<td>Subtitles &amp; Transcript</td>
<td>Screen-capturing device &amp; interviews</td>
<td>18</td>
<td>ESL</td>
<td>Students in the higher proficiency group exhibited significant comprehension of the learning materials; more time interacting with subtitles than students in the lower proficiency groups.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Study</th>
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<th>No.</th>
<th>L2</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hoven (2003)</td>
<td>Comparing high- &amp; low-proficiency learners on their use of help functions</td>
<td>Grammar reference notes, replay facility, midtask answer checking</td>
<td>Informal focus groups</td>
<td>9 in each of 3 cohorts</td>
<td>Indonesian</td>
<td>High-proficiency learners tended to use help options regularly. Lower proficiency learners tended to increase help option use before tests.</td>
</tr>
</tbody>
</table>
Help Options in Grammar and Writing

Although Cobb (1999) compared the effectiveness of concordancing for retention of lexical items, few studies have examined their effectiveness for writing and learning of grammar. Kaur and Hegelheimer (2005) investigated the use of a combined online tool (concordance program and dictionary) and an online dictionary to see how they would contribute to the transfer of word knowledge to an academic writing task. Results indicate that students who had access to both the concordancer and the dictionary showed more frequent and successful attempts to use new lexical items than those who had access to the dictionary only. Heift (2006) investigated the effects of feedback, exercise type, and language level on context-sensitive help and found that learners are more likely to “seek dynamically generated help than explanations provided on static pages” (p. 251). Additionally, exercises that require accurate knowledge and active involvement in the construction of sentences at the morphological and semantic levels are more likely to prompt help option use (see Table 7).

Table 7
Help Options in Grammar and Writing

<table>
<thead>
<tr>
<th>Study</th>
<th>Issues</th>
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<th>No.</th>
<th>L2</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cárdenas-Claros (2005)</td>
<td>Preferred help option of field dependent-/independent-learners &amp; patterns of behavior</td>
<td>Dictionary &amp; Transcripts</td>
<td>Tracking system, oral interview, posttest</td>
<td>20</td>
<td>ESL</td>
<td>Field-dependent learners used the transcripts more frequently. Field-independent learners used the dictionary instead. No pattern of behavior could be exclusively associated to field-dependent or field-independent learners.</td>
</tr>
<tr>
<td>Jones (2006)</td>
<td>Effects of collaboration &amp; use of pictorial &amp; written annotations</td>
<td>Combination of visual &amp; written annotations</td>
<td>Tracking system</td>
<td>68</td>
<td>French</td>
<td>Learners working collaboratively with access to combination of pictorial &amp; written annotations were superior.</td>
</tr>
</tbody>
</table>
**Help Options in CALL**

<table>
<thead>
<tr>
<th>Study</th>
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<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bland, Noblitt, Armington, &amp; Gay (1990)</td>
<td>Use of electronic bilingual dictionary to do writing assignments</td>
<td>Electronic dictionary</td>
<td>Tracking system</td>
<td>10</td>
<td>French</td>
<td>As lexical development took place, words requested seemed less tied to the native language at first. Then, words moved closer toward concepts in the second language &amp; sometimes even to words in the second language.</td>
</tr>
</tbody>
</table>

In summary, similar to research examined in other learning environments in which users have to momentarily abandon the task they are working on to look for help, research on help options in CALL suggests that it is more likely that learners do not use help options if the options are not readily available for them to use (Chun, 2001; Pujolà, 2002) or if the options require from learners more than one step to be used. However, it seems that the more the learner manipulates the same lexical item by copying, pasting, or dragging, the greater the chance for retention to take place (Chun, 2001). One key challenge is to create help options that are attractive to learners yet do not hinder learning.

**CURRENT SLA THEORIES INFORMING HELP OPTIONS IN CALL**

In response to concerns that there is a lack of SLA theory to guide help option conceptualization and development (e.g., Doughty & Long, 2003; Heift, 2006), we discuss how the interactionist perspective has been used to inform help option design. Interactionists argue that, in addition to manipulation of input through interaction, learners need opportunities to negotiate meaning and receive corrective feedback to be better able to regulate language production or output (Mackey & Gass, 2006).

Researchers investigating help options have used the interactionist account to guide different stages of research. Hsu (1994) interpreted learners’ requests for help as a way for learners to overcome the breakdowns in understanding that they experienced when interacting with an aural passage. Liou (1997) used the interactionist account because in her view the “design of the courseware reflected the interaction negotiation model proposed by Long” (p. 87). Grgurović and Hegelheimer (2007) went further in identifying a specific component relevant to the design of instructional materials in CALL:

> A key component of this [interactionist] theory—that only the input that is noticed or apperceived can become beneficial—provides guidance for the design of instructional materials, which should contain features that enhance input through modifications. (p. 46)

Revisiting Ellis’ (1999) work on interaction, Chapelle (2003) identified three types of basic interaction: interpersonal (between people), intrapersonal (within a person’s mind), and that which occurs between a person and a computer (learner-computer). Chapelle noted that most users “are accustomed to initiate learner-computer interaction when they click on a hypertext link to receive help with comprehension or seek dictionary help” (p. 58). This does not necessarily mean that for computer-learner interaction to take place students have to use help options; rather, help option use can serve as a quantifiable indicator that further evidences learner-computer interaction. One benefit of learner-computer interaction identified by Chapelle was that of obtaining enhanced input. But how does enhanced input relate to help options?
Help Options as Forms of Enhanced Input

Sharwood-Smith (1993) defined input as the “potentially processable language data which are made available by design or by chance, to the leaner” (p. 167). Enhanced input, then, refers to the adjustments such ‘data’ receive so that learners’ comprehension is increased.

We argue that different types of enhanced input can be and have been operationalized through help options (see Table 8). The first column in Table 8 lists the types of enhanced input with their corresponding subcomponent as described in Chapelle (2003). The second column sets out the kind of help options used to implement enhanced input in CALL materials.

Table 8
Operationalizing Help Options

<table>
<thead>
<tr>
<th>Types of enhanced input</th>
<th>Help options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salience</td>
<td></td>
</tr>
<tr>
<td>Marked input</td>
<td>Visible links, glossed words, etc.</td>
</tr>
<tr>
<td>Repetition</td>
<td>Video/audio control features (replay, rewind/fast forward buttons), repeat</td>
</tr>
<tr>
<td></td>
<td>button (aural and textual repetition), repeat button (aural repetition</td>
</tr>
<tr>
<td></td>
<td>only), aural annotations, etc.</td>
</tr>
<tr>
<td>Modification</td>
<td></td>
</tr>
<tr>
<td>Visual modification of aural materials</td>
<td>Still images, interactive images, video clips, transcripts, subtitles,</td>
</tr>
<tr>
<td></td>
<td>closed captioning, etc.</td>
</tr>
<tr>
<td>Visual modification of text</td>
<td>Still images, interactive images, video clips, visual annotations</td>
</tr>
<tr>
<td>L1 translations</td>
<td>Textual annotations, bilingual dictionary</td>
</tr>
<tr>
<td>L2 definitions</td>
<td>Textual annotations, monolingual dictionary</td>
</tr>
<tr>
<td>Elaboration</td>
<td></td>
</tr>
<tr>
<td>Enriched input</td>
<td>Cultural notes, grammar explanations, concordancers</td>
</tr>
</tbody>
</table>

Help options usually take the form of temporary input enhancements to which learners have access with a click of a button. Input enhancements are achieved through salience, modification, and elaboration/enrichment. According to Chapelle (2003) salience can be achieved through

1. marked input (e.g., highlighting, changing font size, hyperlinking) and
2. three forms of repetition
   a. including multiple instances of the target form in the input,
   b. providing learners with access to control features that allow them to see or hear the input multiple times, and
   c. designing learning tasks that require learners to use the same linguistic form in different situations and modes.

Studies investigating salience through the effects of visible versus invisible hyperlinks in CALL (De Ridder, 2002; Nikolova, 2004) illustrate how materials can be manipulated in a way that students’ attention can be drawn to specific linguistic features. Repetition has been examined by giving learners access to (a) audio and video control features (Liou, 1997, 2000; Pujolà, 2002; Hegelheimer & Tower, 2004; Grgurović, 2005), (b) repetition buttons that in-
clude aural input plus text (Hsu, 1994; Hegelheimer & Tower, 2004), and (c) different routes to access the same input (Heift, 2006). Aural repetition plus text (e.g., transcripts, subtitles, etc.) seem to have a greater effect in helping students understand learning materials than aural repetition alone (Hsu, 1994; Hegelheimer & Tower, 2004).

Modification of input refers to "the provision of an accessible rendition of the L2 input" (Chapelle, 2003, p. 45). Modifications can be operationalized by providing tasks with additional visual material, first language translations, and second language definitions. One of the recurring findings in help option research examining modification of input through visuals is that learners tend to remember information that is presented through a combination of visual and textual annotations more often than when learners are presented with verbal annotations only or no annotations at all (Chun & Plass, 1996; Jones, 2006; Yeh & Wang, 2003; Yoshii & Flaitz, 2002). One of the main concerns when using visual modifications is the difficulty in representing polysemous expressions and abstract concepts through pictures (O'Bryan, 2005).

In research examining the use of translations as a form of modified input (Grace, 1998; Chun & Payne, 2004; Laufer & Hill, 2000; Liou, 1997; Pujolà, 2002), three central themes have emerged: (a) beginning learners tend to use translations more frequently than intermediate learners, and intermediate learners more frequently than advanced learners; (b) the format used to present translations influence vocabulary acquisition and reading comprehension, and (c) the combination of still images and translations results in better acquisition of incidental vocabulary.

As for the use of translations as a form of modified input, although access to definition-only glosses seem to help student retention of lexical items (Hegelheimer, 1998), Al-Seghayer (2001) reported that learners who looked up a combination of video clips and definitions tended to remember more unknown vocabulary than learners who looked up a combination of still images and definitions.

One concern of help option research that examines modification of input is how to provide a balance between the quantity and the quality of modifications to learners at different proficiency levels. Modifications that appear to be beneficial for some learners are unfavorable for others. For instance, lower level learners may find that different modifications of the same input is confusing, but higher level learners may find such modifications beneficial for comprehension (Rost, 2007).

Chapelle (2003) notes that SLA researchers agree that enrichment of input is more beneficial for learning than simplification because learners are exposed to forms closer to the ones used by native speakers of the language. Chapelle suggests that elaboration may be achieved by adding grammatical phrases or clauses to the text. Other ways to achieve elaboration of input is by providing cultural notes, additional grammar explanations, and access to concordancers.

At present, studies on help options appear to support Chapelle’s (2003) hypothesized benefit of learner-computer interaction (obtaining enhanced input) in line with interactionist frameworks. As further research is conducted, it is important to note that there is a need to identify how learners co-construct meaning when they interact with help options. Further, we need to investigate how learners receive assistance so that we can advance our understanding of optimal learning designs.
COMMON RESEARCH METHODS AND PROBLEMS

Researchers investigating help options have used a number of methods to examine learners’ actual use of such facilities. The methods more commonly used are tracking systems (Hegelheimer & Tower, 2004; Cárdenas-Claros, 2005; Heift, 2006; Jones & Plass, 2002) and screen-capturing devices (Grgurović, 2005; Pujolà, 2002).

Tracking systems are software applications that keep numerical track of the steps learners follow as they perform learning tasks on the computer. Reports can include, for example, data pertaining to page access, elapsed time, and activity order. Using a tracking system, Liou (2000) found that learners’ actual behavior could be recorded over different sessions systematically and consistently. Cárdenas-Claros (2005) recorded detailed logs of student activities and was thus able to identify consistent patterns of behavior.

Tracking systems appear to be the ideal tools for collecting data as students interact with help options. However, two of the perceived disadvantages of these tools are that data do not include any explanation of student thoughts and processes (Liou, 2000) and that the accuracy of the data may vary if the learning task and the tracking system are not altogether compatible (Cárdenas-Claros, 2005). Because of these shortcomings, researchers may fail to discover factors that influence learner behaviors. To overcome such limitations, some investigators have suggested using tracking systems alongside other measures (e.g., interviews and questionnaires) to triangulate student data (Liou, 1997, 2000; Jones, 2003).

Screen-capturing devices are applications that make visual recordings of student-computer interactions and have also been used to collect data in help option research. The perceived advantage of using screen-capturing software is that researchers can view recordings over and over again which may provide detailed data that cannot normally be captured through regular observation (Pujolà, 2002). This benefit, however, may become a drawback because of the large amount of time required for data collection and processing. In addition, the size of the files may make it impossible for the researchers to easily manage data from a single source (Grgurović, 2005).

Not surprisingly, our review of help options highlights problems that commonly plague CALL research, including a limited number of participants, time constraints for students to interact with a task, and limited access to data. Other problems arise as a consequence of poorly designed software and lack of help option use. We group these factors into two categories: factors related to research design and factors related to materials design (see Table 9).

Table 9
Common Problems in Help Option Research

<table>
<thead>
<tr>
<th>Factors</th>
<th>Problems encountered</th>
<th>Studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Materials design factors</td>
<td>Help options difficult to find</td>
<td>Cárdenas-Claros (2005), Liou (1997), Hegelheimer &amp; Tower (2004), Grgurović (2005)</td>
</tr>
</tbody>
</table>


Factors Related to Research Design

Limited number of participants

As Pujolà (2002) pointed out, using a limited number of participants who behave in varied and distinctive ways makes it difficult to draw conclusions. Grgurović and Hegelheimer (2007) also noted the limitations of data interpretation with a small number of participants in mind.

Limited sources of data

Relying solely on the tracking logs in an investigation of help options, for example, does not reveal the reasons behind a learner’s use or nonuse. Jones (2003) completed one of the few studies that has shed light on how annotations are used from the perspective of the students. In this study, Jones purposively selected 20 participants to take part in a postsessional interview. Participants believed that having the option to process aural materials aided by annotations was very helpful for the comprehension of aural texts and acquisition of vocabulary. Grgurović (2005) inquired into students’ preference for annotations between transcripts and subtitles and found that students preferred using subtitles because they found them less distracting. Participants in Grgurović’s study noted that familiarity with watching closed-captioned movies at home transferred well to their work on classroom tasks.

Time constraints

Since most studies have taken place as part of regular classes, time limitations seem to affect research because data are elicited under very controlled situations (Ariew & Ercetin, 2004). Kaur and Hegelheimer (2005) noted that time constraints also affect student’s interaction with help options since they are more worried about finishing the task during the given time than in making use of the enhanced input.

Factors Related to Materials Design

Help options are difficult to find or simply ignored

Cárdenas-Claros (2005) found that students resisted accessing glossed words because they had to first access related transcripts. Pujolà (2002) argued that even if learners accessed the dictionary, they did not check the definitions because by the time the dictionary was uploaded to the program, they seemed to have forgotten about it. Grgurović and Hegelheimer (2007) required students to use help options once incorrect answers were automatically detected. Students reported, however, they did not like the loss of autonomy and in a way found it annoying for the program to make decisions for them. Pujolà (2002) explained how the cultural notes presented as help options in his program were ignored by one of the students, simply because the student did not know they actually existed.

Another aspect of materials design that researchers have pointed out (Cárdenas-Claros, 2005; Grgurović, 2005; Hegelheimer & Tower, 2004; O’Bryan, 2005) is that flaws in the research design may contribute to the perception that materials design is to blame for low rates of help option use. Chapelle (2005a) stated:

a finding that appears frequently but is discussed seldom is that learners tend not to use help very much on their own. This finding is seldom presented in a prominent place in published studies, but, if the interaction data is presented, it is frequently apparent. (p.11)
In studies of online listening comprehension, dictionaries tend to be underused or completely ignored more so than in reading comprehension or vocabulary acquisition tasks (Hegelheimer & Tower, 2004; Cárdenas-Claros, 2005). Although researchers have provided alternatives to learners, the paucity of help option use remains unchanged. For instance, Hegelheimer and Tower (2004) suggested that by leaving a dictionary link visible at all times students would be prompted to access it more frequently. Grgurović (2005) followed this suggestion, but students still did not access the dictionary at all.

FURTHER RESEARCH

Examination of help options from the perspective of sociocultural theory, language assistance and computer assistance, improved software design, improved language task design, and learner training are five avenues for research worth investigating.

Sociocultural Theory Perspective

Several CALL researchers see sociocultural theory as a potential way to frame and interpret findings in CALL (Levy & Stockwell, 2006; Ganem-Gutierrez, 2003; Warschauer, 2005). We believe that help options can also be examined through the lens of sociocultural theory. Since researchers tend to agree that help option usage assists learners in repairing breakdowns (Hsu, 1994; Hegelheimer & Tower, 2004; Grgurović & Hegelheimer, 2007) and performing language tasks (Pujolà, 2002), it may not be farfetched to hypothesize that an effective use of help options may fill the gap between what learners can do on their own and what they can do after usefully interacting with help options.

Framed by sociocultural theory, help options can also be seen from the perspective of the novice-expert account. In this way, help options could be seen as the ‘experts’ who possess additional information a ‘novice’ may need to understand learning materials. As learners (novices) experience difficulties, they may request additional forms of enhanced input through help options. Once learners are exposed to different forms of enhanced input, it is likely that they will be able to repair perceived breakdowns in understanding and, consequently, better perform second language tasks.

Language Assistance and Computer Assistance

As Barrette (2001) notes, “many teachers include CALL activities in the belief that they aid language acquisition only to discover that students need greater computer proficiency than they really possess in order to reap the benefits of the activities” (p.8). Clearly, in future research, we need to be sensitive to the possibility that differences in language proficiency and computer literacy levels may confound observations of learners’ help option usage. Research designs may well need to include participant scores as they relate to tests of computer and information literacy (e.g., iSkills Assessment) as well as standardized scores on recognized language proficiency examinations (e.g., TOEFL or IELTS).

Improved Software Design

Although we are careful here not to suggest that technocentric ‘solutions’ would address many current limitations, we believe that improved software design could bolster the efficacy of help
option usage. One way, perhaps, is to encourage the active involvement of end users in the design of the CALL applications.

Suggestions and models for end-user participation are available (Levy, 2002; Colpaert, 2004; Farmer & Gruba, 2006). Colpaert (2004) identified four possible roles for learners to play in CALL (software user, language learner, communicator, and contributor to the design process). Learners can assist software designers through guided, active engagement at all stages of the process (Farmer & Gruba, 2006).

The creation of help option 'agents,' small bits of integrated software that suggest when to best make use of help options, may spur the development of context-sensitive help. Here, the application would identify specific aspects of the language that require intervention from the learner to be solved. Continued work in the direction that Heift (2006) has forged concerning metalinguistic (detailed explanation) and repetition (hint about the type of category violated) context-sensitive feedback may prove fruitful, particularly for the acquisition of grammar and vocabulary. Designs for improved help options in reading and listening, however, may be much more challenging.

**Improved Language Task Design**

Language task designs that stimulate the need for help at key points of interaction may be another way forward. Grgurović (2005) directed students to use help options to repair listening faults, but students reported that they did not like limited application control. We need to find ways that encourage, not force, help option use. In Jones's (2003) study, because learners working in dyads needed to agree on a single answer, they accessed annotations for verification purposes. This verification, in turn, exposed them to different forms of enhanced input that appeared to have contributed to listening comprehension and vocabulary acquisition. We believe that designing tasks that require collaboration may stimulate help option use, but further research is need to clarify interactional factors and pinpoint specific instances that require assistance.

**Learner Training**

Chapelle (2005a, 2005b) identified the need to ‘help learners to use help’ as a key research concern and charged CALL professionals with the task of “helping learners be aware of the value of online help and encourage their use” (2005a, p. 11). Hubbard (2004, 2005), too, stressed the importance of staged and longitudinal learner training research. Hubbard (2004) also underscored the benefits of learner training in CALL to help control for variables such as student’s confidence, novelty effects, and anxiety. Importantly, Hubbard noted that “the learners need to understand the importance of making a connection between a particular CALL activity and some desired learning outcome or progress toward it” (2004, p. 53).

Most learner training in CALL has focused on training learners to use individual CALL applications. Few, however, have specifically examined learner training in help options. O’Bryan (2005) investigated whether training learners to use CALL effectively following Hubbard’s (2004) five-step approach led to increased gloss use. In her study, she found that although “the results did not show that training lead to increased gloss use, they did show that learner training led to greater awareness and understanding of the theory and pedagogy behind the design of the online unit” (p. 21). She qualified her findings with the limitations of the small number of participants and short training period and advocated for research into likely variables that affect help option use.
The form that training on help option use should take at this point is unclear. It will surely need to address the reasons second language learners have for using or not using help options along with strategy training. The five principles for learner training presented by Hubbard (2004) (experience CALL yourself, give learner's teacher training, use a cyclic approach, use collaborative debrief, and teach general exploitation strategies) seem a good starting point, but still the learners' voices need to be heard.

In our view, training in help option use is needed because this type of guidance can raise learners’ awareness of help option use, foster autonomous learning, and change some of the misconceptions associated with the use of help options.

**Raise learners’ awareness of help option use**
Help option training can provide learners with tools that allow for the identification of specific instances in which help option use can promote learning rather than hindering it.

**Foster autonomous learning**
Help option training can increase the possibilities for learners to be able to identify instances in which help option use is beneficial and not detrimental. It can enable them to make informed choices which will also be reflected in their selection of help options.

**Change misconceptions associated with help option use**
Help option use appears to be associated with low-proficiency learners. Perhaps counterintuitive however, research in help options has found that high-proficiency learners benefit more from the interaction resulting from help option use (Hegelheimer & Tower, 2004; Grgurović & Hegelheimer, 2007). Help option use in CALL should not necessarily entail admitting ‘defeat,’ as it may be perceived in help system design environments. Instead, help option use needs to be promoted in a way that encourages autonomous learners to make use of help options. As they progress, such learners can better self-assess their abilities with and without computer-based assistance.

**CONCLUSION**
This paper provides CALL scholars and practitioners with a systematic review of help options. Five themes emerged:

1. Different language skills require the use of different types of help options.
2. Learning objectives determine the types of help options to be included in a program or activity, the interface design, and the amount of control given to learners.
3. Learners ignore or rarely use help options. When help options are effectively used, however, learner understanding of learning materials, rates of task completion, and learning outcomes are improved.
4. Learner differences, including proficiency level and familiarity with help options, influence the frequency of their use.
5. Learner training can improve student choices on when and how to find assistance.

The outcomes of research on help options support the benefits of learner-computer interaction identified by Chapelle (2003) as ‘obtaining enhanced input.’ Thus, through the use of help options, learners have access to salient, enriched, and modified input available to them on demand. One concern we have identified is whether learners choose either to receive some type of enhanced input with a click of a button or choose not to click.

We have also proposed four avenues for research on help options. We have suggested that the sociocultural theory could serve as a valid framework to interpret findings on help option research and that help option use promotes scaffolding. Help options may be seen as the ‘experts’ who possess the additional piece of information learners need to advance their understanding of input. Then, the interaction of the novice with the expert fills the gap between what learners can do alone and what they can do with the assistance provided.

Further, we find learner training to be a potential avenue for research. The form of this training needs to be shaped by including students’ perceptions on help option effectiveness. We believe that through training learners will be helped to help themselves to help, autonomous learning will be fostered, and some of the misconceptions associated with help option use will be changed. As for the need of improved software and task design, we have argued that this improvement could be accomplished by getting the end user involved in the design of help options by taking advantage of participatory design techniques. Clearly, more research is needed before optimal design features can be identified. We have also argued that the best way to exploit the resources at hand (i.e., currently available software) would be to identify, create, and use tasks that stimulate help option use in a way that is useful for language learning. Peer work appears to be one way to get this accomplished but, again, more research is needed to identify the likely variables that prompt effective use of help options.

REFERENCES


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