Computer-Assisted Writing in CALL

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Introduction

The primary objective of the present study is to seek a theoretical rationale for the use of CALL (Computer Assisted Language Learning) in writing. Although modern writing tools enable us to produce what pen-and-paper writing could not achieve, the theoretical value of CALL for writing is still by no means clear. In reality, it is often observed that this revolutionary tool ends up being a mere replacement for the traditional writing medium as Grabe and Kaplan indicated (1996: 21).

The author of this study believes that it is necessary to ascertain whether the modern tools for writing guarantee beneficial effects, and if so, why and for what aspects of writing they do so. For this purpose, previous studies on the use of computers in writing will be reviewed first. Following this, a theoretical attempt will be made to justify the use of CALL for writing. Finally, the results of a survey conducted in a computer-assisted writing class will be presented along with the activities of that class.

Use of Computers for Writing

Among the countless studies of computer-assisted writing, the following three meta-analytical reviews are worth citing to grasp the general outcome of the research in this area. First, referring to approximately one hundred previous studies on word processing research in both L1 and L2 writing, Pennington (1993) disclosed that "the properties of word processing, though beneficial under certain circumstances, do not yield positive effects in all cases" (231).

Snyder (1993) reviewed studies on L1 writing. In general, her findings confirm the qualitative improvement of written texts and strategic gains, but the most important conclusion was that writing instruction is a key for the success of computer use in writing.

The third meta-analytical review is by Bangert-Drowns (1993). Carefully selecting 32 studies in L1 writing, he

performed statistical re-analyses and compared their quantitative results. Among his major findings, the most important one was that "the accompanying instruction must explicitly identify and practice the skills that one expects to gain from the tool in order for those gains to occur" (88-89).

In sum, it is highly reasonable to deduce from the conclusions of these three studies that the effects of computers on writing will not be noticeable unless computer-assisted writing is integrated with appropriate writing instruction. To give a theoretical account of the importance of writing instruction, the role of CALL in writing will be discussed in the next section.

Positioning CALL in a Writing Model

Since a process-oriented approach dominated the theory and practice of writing instruction, many attempts have been made to design a descriptive model of writing so as to understand the mechanism of writing better. Two of the best-known models are Flower and Hayes (1981) and Scardamalia and Bereiter (1987). From the perspective of writing processes, these two models are of great interest; however, we need a more comprehensive model of writing for the purpose of the present study because computer-assisted writing concerns more than just the psychological processes of composition. Furthermore, both of these models were based on data elicited from L1 writers, and they do not include the role of language competence, which is unavoidable in discussing any issues related to L2 learning.

An alternative model, which seems to be most suitable for understanding the role of CALL in L2 writing, was designed recently by Grabe and Kaplan (1996). This writing model comprises two major components: a *context* for language use (external) and the language user's *verbal working memory* (internal). (For a further explanation of this model, see Grabe and Kaplan 225-235.) Using this model, the theoretical function of CALL for writing will be discussed below. The author of this study considers that there are only two components which can logically be affected by CALL.

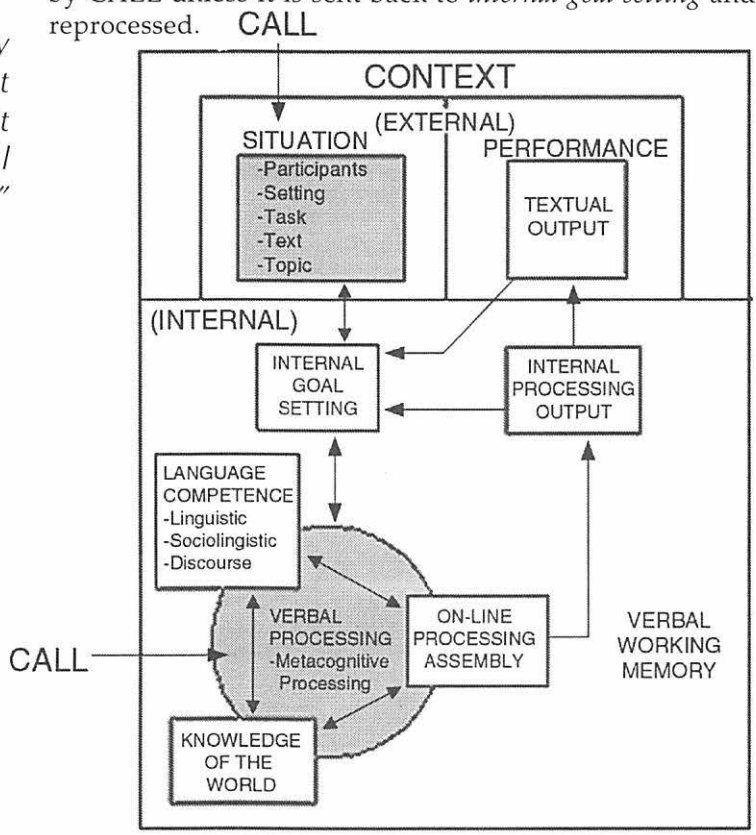
Grabe & Kaplan's Model of Writing

The first component is the *situation*. Since this is an external factor of writing, the influence of CALL must be derived from external functions of CALL. One of the unique features of CALL is that it can create a real or pseudo-real social context for writing. A good example is the case where CALL is used to exchange written messages with other writers. Through a network system, e.g. the Internet, writers

can write for a real audience, which naturally determines a writing context regarding a topic, an expected register, the purpose of writing, and so forth.

If there is any internal component affected by CALL, it must be *verbal processing*. The other two major components are unlikely to be influenced for the following two reasons. First, *internal goal setting* adjusts goals of the writing according to the context of writing, and CALL itself does not seem to help the writers achieve this purpose. The other component, the *internal processing output*, is the mental outcome of encoded informational resources. Therefore, it is hard to determine if the obtained outcome is influenced by CALL unless it is sent back to *internal goal setting* and reprocessed.

"If there is any internal component affected by CALL, it must be verbal processing."



The *verbal processing* component, on the other hand, integrates three subcomponents and handles metacognitive processing while the writers engage in writing, and this component can be controlled and probably strengthened by various functions of CALL. Interacting with a computer monitor or messages that are delivered by a CALL system, the writers attempt to encode their ideas by activating their

metacognitive ability. Therefore, some influence on their verbal processing seems to be undeniable. In addition, a writing teacher can directly observe what the writers do while they are writing and can give appropriate suggestions through the monitoring function of CALL. Similarly, using a network system, more than two writers can share their writing activities and engage in collaborative writing. If a CALL system has intercom facilities, students can also discuss their writing activities mutually. All these specific features of CALL probably can enhance the learners' verbal processing ability.

The influence of CALL has to be interpreted cautiously because the processing components are not influenced by CALL alone. A real audience can be assigned by finding actual readers. The instructor's monitoring can be achieved, albeit more intrusively, by simply sitting next to a writer, and collaborative writing can also be accomplished if students are advised to work on the same topic physically together. In other words, CALL itself is a means to create a situational context easily and to facilitate the *verbal processing* efficiently, but it does not guarantee positive results unless it is supported by appropriate instruction. Its effects are probably not a matter of all or nothing, but rather a matter of degree.

Application Example of CALL

Of the two components discussed above--internal goal setting and verbal processing, the influence of CALL on the internal component will be considered further in this last section. To investigate whether L2 learners' metacognitive processing ability for writing can be developed by CALL, an experimental class was conducted in an updated computer classroom during the Spring Semester, 1997. It was a writing class for sophomore EFL students majoring in International Studies. Each class lasted 90 minutes and met once a week (in total 15 times), and the total number of students who participated in the following survey was 24.

Instruction and Experiment

Prior to the class, it was hypothesized that the students would be able to analyze a written text better and read it more critically if their metacognitive processing ability were developed by CALL. To validate this hypothesis, an experimental survey was given at the beginning and the end of the semester. The students were asked to correct problems in or write comments about two paragraphs originally written by Japanese college students (Appendix A). They spent 30 minutes working on the two paragraphs. After correcting them, the students counted the number of

corrections and comments according to the ten categories in Appendix B.

The main class activities introduced during the semester were as follows:

- Informal writing: The students were encouraged to write informal email messages in English freely to their classmates. This activity aimed at developing their awareness of the difference between formal writing and informal writing.
- Formal paragraph writing: During the semester, the students wrote five formal paragraphs. After completing the drafts, all the students were asked to transfer them to the instructor. The collected drafts were compiled in one file and transferred back to the students. These drafts were used for the following purposes:

  a) Peer evaluation: Each student evaluated at least five other students' drafts, and their evaluative comments were forwarded to the writers.

  b) The students were advised to revise their drafts as many times as they wanted to, following an instructional lecture covering English rhetorical structures, stylistic variations, basic grammatical problems and mechanical problems.
- Monitoring: The monitoring function allowed the instructor to observe the writing activities directly. When he found some problems or good examples from students' drafts, he interrupted their writing activities and displayed a particular student's draft to the other students. This was done anonymously so as not to cause anxiety to the student whose draft was used as a model.
- Pairing: During the semester, especially in the second half of the semester, the pairing function of CALL was often used. One student was randomly matched with another student by a control console. They transferred their drafts to their partners, and each pair discussed their problems over a headset.

Results of the Survey

Tables 1 and 2 below summarize the results of the survey. (See Appendix B for explanation of coding.) The ten items in these tables were classified into 4 categories (Mechanical: item 1, Lexical: item 2, Grammatical: item 9, and Content: all the other items except 10), and the total of each category is displayed in Tables 3 and 4.

At the beginning of the semester, the students mostly

paid attention to the surface aspects of the paragraphs. Thus, the average numbers of corrections in mechanical, lexical, and grammatical problems are much larger than those of content problems in both paragraphs. This is also supported by the findings of the students' self-reported priority order of corrections (Appendix B). Before they had completed computer-assisted writing activities, 22 students (91.7%) chose item 1 (spelling/punctuation: 10 students), item 2 (inappropriate use of words or expressions: 3 students), or item 9 (grammatical problems: 9 students) as the first point they corrected in Paragraph 1. In Paragraph 2, 15 students (62.5%) chose one of these three items (item 1: 5 students, item 2: 4 students, and item 9: 6 students). Later these numbers drastically decreased to 9 students for Paragraph 1 (37.5%: 4, 4, 1 respectively) and 3 students for Paragraph 2 (12.5%: 1, 1, 1 respectively).

Table 1: Paragraph 1 - Average number of corrections (N=24)

Item	1	2	3	4	5	6	7	8	9	10
Pre-Class	2.4	2.5	0.3	0.2	0.0	0.0	0.0	0.0	2.5	0.0
Post	2.4	3.2	0.7	0.3	0.4	0.5	0.2	0.5	1.9	0.1

Table 2: Paragraph 2 - Average number of corrections (N=24)

Item	1	2	3	4	5	6	7	8	9	10
Pre-Class	2.2	1.8	0.4	0.1	0.0	0.2	0.3	0.4	2.0	0.2
Post	1.9	1.5	0.6	0.3	0.7	0.4	1.0	1.1	1.8	0.0

* See Appendix B for these item numbers

Table 3: Paragraph 1 - Average number of corrections in four categories (N=24)

Category	Mechan	Lexical	Content	Gram
Pre-Class	2.4	2.5	0.7	2.5
Post	2.4	3.2	2.7*	1.9

*p<.01

Table 4: Paragraph 2 - Average number of corrections in four categories (N=24)

Category	Mechan	Lexical	Content	Gram
Pre-Class	2.2	1.8	1.4	2.0
Post	1.9	1.5	4.1*	1.3

*p<.01

The numbers of corrections at the surface level showed no significant differences between the beginning and the end of the semester. The numbers of content problems corrected or commented on, on the other hand, changed dramatically in both paragraphs, and the differences are statistically significant (measured by a paired t-test, $t=7.134$ $p<.01$ in Paragraph 1 and $t=8.254$ $p<.01$ in Paragraph 2). These numbers increased across the board for all the content-related items at the end of the semester.

The most plausible account for these findings is that computer-assisted writing did not affect the students' linguistic competence itself within this short period of time; however, it did change their awareness of L2 writing. It is hard to specify exactly what it changed, but one certain thing is that students analyzed and processed the written texts differently at the start and at the end of the class, and that they became aware of what content components were necessary or unnecessary to write a good paragraph. These changes seem to be brought about because their metacognitive awareness was promoted by the writing activities which were facilitated by CALL.

Conclusion

This study first pointed out that the success of computer-assisted writing depends on writing instruction. Theoretically, there seem to be two areas which could be enhanced by introducing CALL to writing, and this was discussed using Grabe and Kaplan's writing model. This study could not pinpoint the exact internal factor which could be affected by CALL; however, it suggested that it is most likely the *verbal processing* component. This conclusion is still a very rough sketch of CALL's influence on writing, and further investigation is necessary.

In the last section, a brief experimental study was presented. The main finding was that L2 learners' ability to evaluate and revise an English paragraph was clearly changed at a metacognitive level through CALL writing activities. This conclusion is tentative, however, because the experimental study was not conducted under comparative conditions between a control group and an experimental group. In order to validate the specific effects of CALL on the *verbal processing* component, further experimental investigations are necessary.

Finally, it should be pointed out that the CALL environment enabled the instructor of the class to create enjoyable and active learning circumstances which are not easy to realize in the traditional classroom environment. CALL itself may possess hidden capacities as a language learning device, but it does not seem to be an automatic tool to produce ideal results, just as the language acquisition device will not work unless it is activated.◆

Acknowledgments

I would like to thank my colleague Carol Rinnert for her careful review of this study and valuable suggestions. Needless to say, every shortcoming of this study is my own responsibility.

Appendix A

Paragraphs used for the survey at the beginning and end of the semester:

Paragraph 1 My Favorite Season

It is a very well-known thing all over the world that each one of Japanese four seasons have its own features. Therefore, we can enjoy them in each seasson or the exchanges from one season to another. Out of four seasons, spring is most confortable and favorite season for me. The soft wind of spring blow through my body, and the songs of many birds make me happy. As it gets warm little by little, many insects and animals come out from their homes or caves and start their activities again. There are some insects that change their body colors and some animals give birth to their children. And we also begin to go out without puting on coat and sweeters. So spring is the time that we become energetic. I like spring best for this reason.

Paragraph 2 My Favorite Book

My favorite book is Margaret Mitchell's famous novel "Gone With The Wind". I read it when I was a second year studant at high school. This is very long story, and I had never read such a long story until then. Since it was too long that I was very tired after I read it. But once I started reading it, I couldn't stop. I continued reading it until I went to last page. The heroine of this story is Scarlet who is a beautful but strong woman. Though I like this story, I don't like her because of her bad personality. She loves men and money and she is proud of herself too much. Atlanta is the place where this story took place. The Olympic games was held there last year. The reason why I like it is that the story do not end happyly. As I dislike the heroine of this novel I was tired but happy when I finish reading it.

Appendix B

Evaluation Form (The item numbers match the numbers in Tables 1 and 2)

Directions: In correcting the paragraph, to what aspect of the paragraph did you pay attention? Choose three items from the list and write their numbers according to the priority order.

Order: 1 ( ) 2 ( ) 3 ( )

( ) 1) Misspelling and punctuation mistakes
( ) 2) Inappropriate use of words or expressions
( ) 3) Unclear content
( ) 4) Inappropriate introduction of the paragraph
( ) 5) Uninteresting content
( ) 6) Inappropriate conclusion of the paragraph
( ) 7) Unnecessary or irrelevant content unrelated to the topic
( ) 8) Irrelevant logical flow of the passage
( ) 9) Basic grammatical violations such as subject-verb agreement, articles, singular/plural forms of nouns
( ) 10)Others (Describe concretely.)

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