

# Computer Assisted Writing Revision: Courseware Review and Pedagogical Implications

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## Abstract

*The paper mainly discusses the semi-automatic or human-aided aspects of intelligent CALL for writing revision because such degree of automation tangible now by reviewing some recent research the author has conducted. It is then argued that teachers should cooperative with CALL programs to make revision process cost-effective, a relationship where CALL serves well in revision of grammar, mechanics, and spelling, and some word usage and in on-line remedial grammar exercises. The paper reports several research projects recently conducted in Taiwan: evaluation and development of grammar checkers, editing strategy use and achievement of using spelling checkers, and effect of remedial grammar courseware. Pedagogical implications of integrating these CALL programs into classroom are addressed.*

## 摘要

本文探討電腦輔助語言學習在英文為作教學上可以扮演的角色，重點置於文稿完成後的修繕部份，以及英文語法、拼字、標點的正确層面。主要的篇幅探討了文法偵錯器的評估及研發，文法句型練習軟體之研發及評量，和學生使用拼字偵錯器策略之研究。本文最後探討了英文作文老師和電腦輔助作文相輔相成之利，即老師可建議文章內容、組織等語意篇章方面的修改，而由電腦來執行較機械式的文法正誤之指正。

## I. Introduction

This paper addresses the issue of how computer-assisted language learning (CALL) can play an effective role in EFL writing revision. Writing revision tasks may be divided into examination of five aspects in an essay: contents, organization, language use, mechanics, and vocabulary. It is argued that human teachers and CALL may cooperate to make writing revision cost-effective. Under this cooperation, CALL may serve well in assisting grammar, spelling, and punctuation editing/revision tasks for learner who are weak in these aspects or teachers who need commenting help in these regards. In this paper, several CALL research projects on grammar checking, spelling checking, and grammar remedial instruction are discussed to illustrate how CALL -- development, research, and practice-- can be effectively helping writing revision.

Truly, accuracy of writing alone, does not constitute a good paper. Further, it is well recognized by language teachers that a shift to focus of fluency and appropriateness occurred after communicative language teaching arose and started to influence English teaching in Taiwan several years ago. Some are even concerned that use of these tools may lead to product-oriented writing instruction. However, first, communicative approaches do not neglect

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accuracy at all but try to add another dimension of consideration by balancing the predominant emphasis on accuracy of form in the past. In addition, recurrent errors in a piece of student writing demonstrate the learner's immature English proficiency. Some electronic tools to raise learners' form consciousness are consequently helpful. Thus, pursuit of correctness of form in EFL writing has its ground, though research is certainly required to discover how gravity of grammatical mistakes influences the total evaluation of a paper in different contexts. Last, whether use of such tools leads to product-oriented writing instruction depends more on how an instructor designs the curriculum than use of the writing assisting tools.

Focusing on accuracy of form while not sacrificing expressiveness of composing, this paper addresses the issue of writing revision through describing several research projects, and suggesting how on-line CALL can be cooperated with off-line human writing teachers to make revision more cost-effective.

## II. CALL Tools for Writing Revision: Research and Practice

While rating of writing tools from *PC Magazine* (Rabinovitz, 1991) is available, student responses and classroom practice were not considered in the testing. Among several first packages ranked by the article, *Power Edit*<sup>2</sup> (Artificial Linguistics, 1991), *Complete Writer's Toolkit* (System Compatibility Co., 1990), *Grammatik* (Price, 1989), and *Right Writer* (Rightsoft, 1988) were obtained for research and classroom use.

### A. Evaluation and Development of Grammar Checkers

In 1989, two commercial grammar/style checkers were pilot tested, *Grammatik IV* and *Right Writer 3.0*. Of the two packages, *Right Writer* was shown inferior for college freshman EFL majors because of low accuracy rate of detection and batch mode of processing (one cannot see and correct errors while computer processing but simply obtains a marked copy of the paper). *Grammatik IV*, a much more popular package worldwide, was examined through a small-scale study. Twenty-eight college freshman EFL majors were asked to use *Grammatik IV* on one of their essays. Their individual responses to feedback messages generated by the package was individually observed during the process. After the program finished checking the essay, students were requested to fill out a questionnaire which elicited their affective reaction toward the process. Mistakes detected and marked by *Grammatik IV* were recorded on a hard copy of student essays. It was found that comparison of the marked essays with the originals revealed that only fourteen percent (10 out of 70) of the mistakes *Grammatik IV* detected were substantive grammatical errors; the rest were stylistic. Worse, the package missed significant errors frequently made by students, and generated false positives and misleading messages as shown below:

- (1) *Having listening \_ the teachers' word, I was not surprised at the poor score I got as I didn't do the question with caution.*  
[Passive voice: 'was surprised' Consider revising using active]

- (2) *There were great man in the world whom I respected forever.*  
[The context of 'whom' indicates you may need to use 'who']
- (3) *These occupy successively lower vanges on the scale of computer translation ambition.* [Usually 'these' should be followed by a plural noun.]

By style checking, such grammar checkers give a warning message like "over and over again" as a wordy expression and suggest users to replace "repeatedly" regardless of the context. Worse, it keeps suggesting that the user replaces "however" for "but, yet, still" throughout a paper, which annoys most of the subjects. Deficiencies in Grammatik IV led us to develop an automatic English grammar checker which could detect the kinds of major errors our students frequently make (for detail, refer to Liou, 1991 and 1992b).

Thorough empirical investigation of text-critiquing programs or actual classroom use should be conducted, because there exists little evidence. Previous research either lacks a control group for comparison of writing quality, or a valid comparison, or was not conducted in a realistic class setting. It is believed that CALL should be integrated into regular classroom activities so that it becomes a mode of learning. Further, as a teacher-researcher, it is believed that conducting classroom-oriented research can directly benefit classroom practice because the findings can immediately feedback teaching practices. Thus, to address effectiveness of text-critiquing programs through empirical investigation and, if possible, to suggest a good way of employing them in EFL writing classrooms are the purposes of the next study (refer to Liou, 1993 for detail). The study was conducted to examine the effectiveness of *Complete Writer's Toolkit* (CWT) and *Grammatik IV* (G4) while formally with integration of the program to our Freshman Writing Class. The design is a quasi-experimental study with 19 students in the CALL group and 20 in the Control group. A pretest measure indicated that there was no statistical difference between the two groups' writing abilities ( $T < .05$ ). The research procedures are shown in Table 1.

[ insert Table 1 about here ]

Comparison of the post-treatment writing performance between the CALL group and the control group indicated that there was no significant group difference ( $T < .05$ ). This may suggest that use of grammar checkers may not contribute to effectiveness of writing revision or that the sample size is too small to show significant group differences. The important concern for correction effect of using CWT indicated that it exerted some influence on the CALL group: 38% of the total errors could be detected by CWT. It would have eased one fifth of instructor's burden if it had been used in the control group (20.5%).

During the data collection process, when subjects were not satisfied with the critique from CWT, the observer asked if they liked to try another and introduced G4, if the offer was accepted. This happened mostly in more advanced student writers. No quantitative measure was done to compare the performance between that of CWT and that of G4; however, more than 30 cases of error detection examples were taken from running sessions of each package. An impressionistic summary of these samples indicated that CWT did outper-

form G4 in terms of accuracy of error detection in that CWT covers more error types and generates fewer false alarms. However, sophisticated student writers did not think CWT useful in substantive ways but the less proficient students found it useful. While G4 is worse in error correction of grammar and mechanics, it is superior in stylistic checking which may benefit advanced students more.

Other than these, the two packages are very compatible regarding user-friendly and easy-to-operate interface design, error types which can be detected, as well as false alarms and misleading messages they tend to generate. False alarms may not become detrimental for a few lucky learners. For example, in one case CWT generates a false alarm with an irrelevant feedback example as shown in one of the subjects' drafts:

*"As teachers, our great achievement and satisfaction are that all of our students can get somewhere," said my teacher and aunt. Indeed, this feeling is exceedingly strong in my father's mind whose is usually proud of his students' success.*

CWT's feedback:

Some writers prefer to use 'that' rather than 'which' in restrictive (defining) relative clauses. If the relative clause is nonrestrictive, 'which' should be preceded by a comma.

CWT flags whose, though it did not give accurate feedback message but this consciousness raising caused the subject to revise the sentence drastically into the following, which is beyond her regular revision habits.

*"As teachers, our great achievement and satisfaction are that all of our students can get somewhere," said my teacher and aunt. Naturally, they are always proud of their students' successes.*

As for student perception toward use of such a tool, results from the interview indicated that 52% of the subjects liked such packages; 69% of them thought the programs useful for writing revision; 69% of them found use of the programs could save revision time; and 52% thought programs useful for learning. Generally speaking subjects had a positive attitude toward use of such programs. However, the role of peer commenting in our syllabus needs to be re-assessed; at least the way we designed use of it needs to be improved. Because the peer commenting task requires good enough English proficiency and accommodation of scheduling between pair meeting, the interview results suggested that use of such programs may save more time than asking the partner to criticize the paper. In addition, the partner tended to be lenient about the peer's paper but such programs faithfully pointed out the mistakes. This suggests that pair dynamics in the syllabus design may influence the usefulness of the programs.

## **B. Development and Evaluation of a Grammar Drill Package for Remedial Instruction**

When a writing instructor corrects the same mistakes many times, it may occur to him/her whether the learner's fossilized error patterns can be rectified through a computer exercise program. Thus, a research project was set up under such motivation to provide remedial grammar exercises for those students who show deficiency in language structures in order to see if the exercises help improve students' composition quality. The project involved two phases: courseware development and a formal study on the courseware effectiveness (for detail, refer to Liou, Wang & Yeh, 1992a).

The courseware contains ten lessons, each of which has ten question items. There are three exercise formats: guided Chinese-to-English translation, English sentence correction, and English sentence combining. The courseware has two features: (a) the contents are based on empirical error analysis of common mistakes in Chinese EFL students' compositions, and (b) the program provides adaptive remedial instruction, and sophisticated answer judging. To make good use of CALL's adaptivity in individualized instruction, we designed adaptive remedial practice for each item in each lesson. For each major item, there are three practice items addressing the same grammar point (or major pattern) as provision for students who need more drills. If the student makes mistakes in the area of major patterns and fails after three attempts, s/he is routed to the remedial practice unit. In the remedial practice unit, there is provision of recycled items. In each practice item, a student user is given two chances of attempt. If the student is correct in the first attempt for the first practice item, the program skips the last two items but saves them after the student finishes the ten main questions. The answer judging routine features keyword matching and error anticipation, an improvement over very inflexible string precise match. For answer judging in each item, we make a list of possible good, acceptable, and wrong answers. The program tries to search if the input matches any of the anticipated answers/errors. If the input matches, corresponding messages and hints are displayed on the screen. If the input does not match any of the expected correct answers and thus is judged as incorrect, then a string search is done to find out if the major pattern appears in the student input. If the pattern is matched, the student is routed to the practice unit because his/her weakness is targeted. Otherwise, s/he is directed to the next main item.

After the courseware had been developed, a pretest/posttest research design was used to assess the effect of the courseware. The results of the study suggest that the combined use of classroom writing instruction and this CALL strategy may contribute to EFL learners' writing improvement regarding grammatical accuracy.

### **C. Research Findings about Student Use of a Spelling Checker**

While spelling checkers are very common in commercial word processing packages and proved to be effective (e. g., Neu & Scarcella, 1991), little is known about how students make use of such facilities. For example, how does a student learn about English from such checking sessions? What does she do in using such a tool? A small research study was con-

ducted in the Fall of 1991 to investigate what strategies students use. The word processing package used was *Word Perfect* (version 5.1). Thirty-one college EFL students as the subject group were asked to run the spelling checker one by one on their essays while how they used the function and what strategies they used were recorded. For the Spell function in *Word Perfect* (WP), there are several inherent editing strategies which subjects might use: 1. Skip Once; 2. Skip; 3. Add; 4. Edit; 5. Look Up; 6. Ignore numbers. Among them, Skip and Edit were the choices subjects ever made. In addition, when Spell detects a mismatch between words in the WP dictionary and the user's word, it suggests a list of words waiting for the user to choose to replace.

All the on-line choices subjects made as well as off-line or mental strategies inferable subjects used were recorded. The three on-line actions/functions, Edit, Skip, and Replace, imply a knowledge about spelling of words. The off-line strategies (called Other strategies) observed in this study include kinds of resourcing, editing, finding rules, inquiring, searching words, feeling puzzled, detecting, or thinking-aloud (thirteen in total). It was found that unsurprisingly, Skip, Replace, and Edit were the strategies, inherent in Spell, student used the most, whereas other strategies were only used 16% out of the total numbers of strategies. Averagely speaking, Replace was used most frequently, 3.19 times per essay. This also shows that Spell in WP is so sophisticated that the package can guess the intended correct words out of possible typographical errors. There is only .90 time per essay when subjects have to skip a word that WP does not recognize and .65 time when editing a word by subjects themselves -- great discrepancy between subjects' misspelled words and correct ones which WP cannot guess at. Other strategies, infrequently used, indicate a wide range of idiosyncratic students' behavior, and shed light on what students were doing while using a simple CALL writing tool. Note that the three types of resourcing strategies used (use off-line dictionary or textbook, and ask the instructor), constructive to learning, are strongly recommended in encouraging students to use a spelling checker to help writing revision. During the Spring of 1992, very few spelling errors were found in student writing assignments after the function of Word Perfect was required when they typed in the papers (corroborating findings in previous research). This provided strong evidence for the usefulness of a spelling checker.

### **III. Off-Line Applications and Human Cooperation with CALL**

It is obvious from the previous sections that a spelling checker works well in assisting students during their writing revision/editing process. Remedial CALL grammar exercises are proved useful in helping students with sentence-level proficiency. Current commercial grammar checkers may work fine; however, their false alarms and annoying advice about word usage may frustrate students, and their limitations in missing grammatical mistakes unique to specific ethnic groups of learners may even become detrimental for lower-level learners. Caution should be taken in using such programs. In this paper, the author has illustrated how each of the three revision tools or courseware can be integrated into a writing course without

laying too much emphasis on product-orientation in writing instruction. Revision work in the aspects of contents, organization, and appropriateness of word usage, however, requires human teachers' intelligence and efforts. In other words, human teachers may cooperate with CALL to make writing revision cost-effective. Under this cooperation, some pedagogical considerations may be addressed in such an integrated curriculum. For example, teachers may look through contents and organization of students' compositions before they ask students to work on grammar and spelling checkers. In this way, teachers can reinforce communicative functions which an essay tries to get through instead of correcting mistakes in a paper with frightening red-pen brushes from the very beginning. The latter has long been a common practice in Taiwan.

It really relies on how teachers use these automatic CALL tools in their class. Truly, CALL tools toward accuracy and correction remind us of the audiolingual approach or the behaviorism. As an assistant, CALL yet can be placed at appropriate point in a writing syllabus with legitimate emphasis. For instance, in English-for-academic writing class, one does not ask students to write only "fluent" -- though inaccurate -- English papers to fulfill the requirements. Many formal writing asks for rigid conformity to composition conventions; there, a correction revisor is essential.

#### **IV. Conclusion**

Writing revision tasks can be divided into examination of five aspects in a paper: contents, organization, language use, mechanics, and vocabulary. This paper has demonstrated ways of using CALL programs to help revision of spelling, mechanics, grammar, and some aspects of word usage. It seems that automatic revision programs may promise to alleviate part of writing teachers' burden in correcting grammatical or mechanic mistakes, given some initial positive empirical evidence. More research is clearly needed to draw a definite conclusion. As for revision in the aspects of contents, organization, and vocabulary, human teachers still play an indispensable role which computers cannot help in the foreseeable future.

As for the issue of product vs. process orientation toward use of automatic revision tools, this is a method question, instead of a technology question. That is, teachers' ingenuity, and more important, teaching philosophy in their heads, are responsible for the way they use to incorporate all the teaching resources they can command; CALL should not be blamed because computers are simply assistants.

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**Table 1.** Class Activities and Procedures of the Study.

Research Procedures	
CALL Group	Control Group
1st draft S: paper review by peer T: comment on contents and organization  1st week Class Activities  S: revise 1st draft and turn in 2nd draft 1. CWT and G4 critiquing 2nd draft done by S 2. print out final version  T: interview S T: grading final versions	1st draft S: paper review by peer T: comment on contents and organization  1st week Class Activities  S: revise 1st draft and turn in 2nd draft 1. CWT and G4 critiquing 2nd draft done by T* 2. print out final version  T: grading final versions

T: teacher; S: student

\* done by the teacher without students' awareness as a contrastive result for comparison

**Endnotes**

2. Power Edit, with a complicated multi-windowing environment, is hard to master in a short period of time and thus is not further investigated.