CALIS --- A Computer Assisted Language Instruction System

Akira   Tateno
Akiko Aoyama

This paper is divided into two parts. The former part deals with a way of producing multimedia teaching materials with the MS-Windows version of CALIS, whose sample courseware, authored by Akiko Aoyama, was demonstrated at the 20th Annual Convention of Council of College English Teachers, held at Atami on the 6th and 7th of September 1996. We also suggest an effective way of using such materials and CALL Lab (Computer Assisted Language Learning Laboratory) to run them, especially in relation to English education at colleges of technology.

The latter reports some English classes taught by Akira Tateno at Toyama National College of Technology, where MS-DOS version of CALIS is used to help students consolidate their learning. We will describe one type of courseware for English composition class and give a brief account of the feedback mechanism of CALIS. With personal computers on network so popular in use as is multimedia, we teachers of English cannot detach ourselves from CALL. We hope that our modest trials might interest English teachers and lead to their collaboration in the field.

I. Production of computer assisted multimedia language instruction materials on the platform of MS-Windows

The significance of computer assisted teaching materials of English teachers' own making

One of the easiest ways to use computers for English education is to buy CDs for this purpose. There are some showy multimedia materials for learning English on sale (most of which are elaborate, but also very expensive). However, there are a few points that we should bear in mind for their use in school education: apart from the problem of their high prices, *they are not easily incorporated into English classes.* They are produced for personal use, not for school education. If you use these materials in your class, you will soon find that you are used by computers and your class tends to be out of your own control. One of the characteristics of computer assisted teaching materials is that they are far more like humans than textbooks. They respond to students. If you would like to integrate them in your class effectively, you must so to speak discipline these materials as your assistants.

You cannot modify the contents of CDs on the market, so it might be a good way to use these CDs for students' individual use somewhere outside classes, but we don't believe that they are appropriate for English classes. If CALL should contribute

something to English education *at school*, we think it necessary that we teachers can somehow participate in creating teaching materials, like we prepare handouts for our classes.

What is an Authoring System?

Now MS-Windows is the most popular operating system on personal computers (though it does not mean that it is the best), the platform may be a leading candidate for CALL. Then how can we create teaching materials running on MS-Windows operating systems? There are many ways if you are a programmer. You can use any compiler for Windows as you like. If not, your choice should be to find some Windows application program to produce your teaching materials, like you use a word processor application for editing and printing your documents. An application program for making teaching materials for computers is called 'Authoring System'.

What is CALIS?

CALIS is an authoring system for language learning, developed and being developed in Humanities Computing Facility at Duke University in the U.S. This share ware program has two versions, one of which (named WINCALIS) is for MS-Windows and the other (named TEXTCALIS for distinction) for MS-DOS. TEXTCALIS was developed in the latter half of 1980's and in the early 90's, as Windows became more and more popular, they started to transplant TEXTCALIS into the Windows' platform. Although the two application programs have almost the same structure, they are different in three ways, or WINCALIS has three advantages over TEXTCALIS.

i.   WINCALIS accommodates multimedia elements, such as sound and movies.
ii. WINCALIS supports Unicode to edit all the languages in the world.
iii. WINCALIS has its own script editor(named CALAUTH) to alleviate the authors' labor in writing CALIS commands.

The mechanism of CALIS

In structure, CALIS resembles W.W.W.(World Wide Web) browser, like NetScape or Internet Explorer. What is a H.T.M.L.(Hyper Text Makeup Language) document (i.e. a home page on INTERNET) to CALIS is called 'script'. It also has its own tag language similar to H.T.M.L. CALIS interprets each line in a script and depicts it on the screen, followed by the commands (written between '<' and '>' in each line. It also responds to the students' inputs as the commands direct. The following is the first part of the script 'QUIZ.CAL' for the demonstrated courseware.

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***Demonstration Script 'QUIZ.CAL' Authored by Akiko Aoyama
***Video taken from Unit 10, Grape Vine, Oxford University Press
*****************************
*****************************
@<MAXTRIES:10><GIVE:3>
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Main Routine
#0<NOSC><NOPR>
?<ADD: title>
?<ADD: preparation>
?<ADD: preview1--preview3>
?<ADD: mul-choice>
?<ADD: shortans1--shortans2>
?<ADD: cloze1--continue>
#end
*******************************
#title
?<BLA><CE>
?<CE><SET BCOLOR: DKBLUE><SET FCOLOR:WHITE>
?<CE><FS:XLARGE><BO><IT><WHITE><RV>Unit 10<RV><WHITE><IT><BO><FS:
XLARGE>
?<CE>
?<CE>
?<CE><FS: HUGE><BO><IT><WHITE>Quiz of the Week<WHITE><IT><BO><FS:
HUGE>
?<CUR +11,>
?<CE><FS: LARGE><BO><IT><WHITE>Authored by Akiko Aoyama and Akira
Tateno<WHITE><IT><BO><FS: HUGE>
?<CE><FS: LARGE><BO><IT><WHITE>Toyama National College of
Technology<WHITE><IT><BO><FS: HUGE>
?<MCICTRL HIDE>
?<VIDEO: SIZE EIGHTH>
?<VIDEO: LOC CE>
?<VIDEO: PLAY intro>
?<DELAY 10>
?<VIDEO: HIDE>
*******************************
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With TEXTCALIS, authors have to write these lines by themselves. So authors must know the details of the CALIS language. With WINCALIS, however, CALAUTH writes them for you, as H.T.M.L. editors (like Internet Assistant for Word) do when you make your home page with them. As we demonstrated at the Convention, the development time is greatly saved by using CALAUTH, especially in making courseware of a fixed type, such as multiple choice questions, cloze tests or short answers.

Manipulating multimedia elements

Computers treat graphics, sound, and movies as digital data and save them as a file. Once you change these materials into digital data, you can edit them far more easily and minutely with computers than with conventional tools. On the platform of Windows, standard forms of graphics, sound, movies are bitmap, wave and avi, respectively. WINCALIS can manipulate all these standard forms. It also has an editor (named MUTIMEDIA EDITOR) for wave and avi data. With the editor, you

can mark the sound or movie you use in your courseware and name the marked parts. The names are used to present the marked part in your courseware, as 'intro' in the fourth line from bottom in the script above. You can set the marked part to be operated by the students or not to. To digitalize movie date on your video tape, you need a video capture board in a slot of your computer. To digitalize sound, a sound board. To acquire graphics from printed materials, you need a image scanner connected to your computer. The digitalization also is quite easy to operate.

How to use computer assisted instruction materials in English class

With WINCALIS, you can develop almost all types of teaching materials for language learning. Then what type of teaching materials are useful and what are effective ways of using computer assisted instruction? We are sorry that we have no experience using multimedia materials authored with WINCALIS in our English class, as we don't have the facilities for it. But our suggestion is that the best be their supplementary use in your class. We English teachers spend a lot of time writing handouts for practice, giving and marking tests to encourage students to study. Computer assisted instruction materials are excellent substitutes for these. They can be *prints containing text, graphics, sound and movies in it, together with hinting, marking and feedback functions*. Generally, the most efficient way of using computers is to let computers do mechanical, routine work. Suppose that you have 40 dull but extremely faithful and devoted assistants, then what part of your job should be assigned to them? We believe that before long the day will come when we must ask ourselves what part of our job is human, creative or what part constitutes teachers' work as human beings.

CALL LAB and English education at Colleges of Technology

To use WINCALIS in your class, the computers should be connected through LAN (Local Area Network). Unlike TEXTCALIS, which deals with only text, WINCALIS uses multimedia-related files. These files are too huge to be carried on floppy disks. The demo courseware contains 75-megabyte avi file in it. Therefore what you need is a client-server system of Windows machines, headsets and maybe cassette tape recorders if you want your students to record the sound for their homework. This is the minimum requirement for CALL LAB realized on the platform of Windows.

The relation between CALL LAB and conventional Language Laboratories (LL) can be compared to computers and word processors. Word processors are computers for one exclusive use. CALL LAB performs all the functions that conventional LL has and much more. You can use it as a sophisticated LL, you can use it for CALL, for information processing, for searching W.W.W., for correspondence by email all over the world, and so on.

CALL LAB costs three or four times as much as conventional LL.. It also requires some knowledge about computers and their network. Is such a heavily

equipped device really worth installing?

We believe that it is for colleges of technology. The reasons are:

i. All the colleges of technology have LAN connected with INTERNET. We also have human staff to manipulate the network. So we already have infrastructure for CALL LAB.

ii. All the students at colleges of technology must more or less learn to use computers. The more they use computers, the more they will learn.

iii. The characteristic of education at colleges of technology should be its practicality. CALL LAB provides the students with an ideal environment where they can *use English*.

CALL LAB may indeed be a heavily equipped device for now, but so were LL, cassette players, copy machines, printers, textbooks and blackboards at one time. INTERNET shows an unprecedented possibility of collective creation and use of intellectual resources. We hope that in the near future, through INTERNET collaboration, CALL will be one of the important characteristics in English education at colleges of technology.

II. Using TEXTCALIS in English composition class

In 1994 when I (Akira Tateno) was to have four classes (each, 90 minutes once a week) of first-year students in 'English Expression', I decided to use TEXTCALIS for supplementary drills in the classes. The next year I continued to have the same classes and used TEXTCALIS for the same purpose. This is a report of using TEXTCALIS in those classes. For practice with TEXTCALIS, I used the computer room on the second floor in our library, which is two or three minutes' walk from the classrooms. We have 42 NEC personal computers for students' use there. At that time, the computers were not networked and the operating system running on those computers was MS-DOS. The textbook was NEW ACCESS TO ENGLISH WRITING published by Kaitakusha Inc.

Advantage of TEXTCALIS

TEXTCALIS cannot manipulate graphics, sound, or movies nor does it support a mouse. Still it has an advantage over WINCALIS: it can run on DOS machines with low capabilities. It does not need a computer network. Teaching materials can be delivered by floppy disks.

The NEC version of TEXTCALIS was transplanted for NEC 9800 series of computers from the original IBM version by me in 1992 when I was at Duke University. After I returned, I have been improving this version to meet several demands for its use in my class. The hinting mechanism described later was an extension added by me to save authoring labor. For shorter notation, hereafter I will just write 'CALIS', denoting this NEC version of TEXTCALIS.

The objectives of using CALIS in English composition class

In using CALIS in the class, I had three things I expected it to do.

i.   To help students consolidate their learning of words and phrases
ii. To help students understand grammar through practice
iii. To show students a definite and concrete goal to reach

I did not expect CALIS to help students write a consistent English composition nor did I expect it to help them write a creative or logical English. These were the things which I should teach elsewhere in the class but not with CALIS. My objectives with CALIS were quite limited: to give students effective drills to acquire such elementary skills, as memorizing words and phrases, learning word order or usage of function words, like auxiliary verbs or prepositions, to make an English sentence.

Typing practice

To use CALIS, students must learn to type. I spared typing practice for the latter half of the first 8 to 9 periods. There are a few free computer programs to learn typing. After I taught basics of using fingers to type, I let students improve their skill with one of those free typing programs. Most of these programs can measure students' achievement and some of them allow you to edit exercises in it. I made exercises for typing, using the words or sentences the students then studied in the textbook.

The type of the exercises with CALIS

Although almost any type of teaching materials for language learning can be authored with CALIS, I made use of just a few types of them for saving authoring time. The type which I exploited most often was conditional construction of an English sentence. I made exercises of the following type, by slightly changing sentences in the textbook.

DIRECTION WINDOW

[   ] 内の単語を使って日本語の意味になるように、英作しなさい。
但し、名詞は単数形が、動詞は原形が出ています。必要なら変化させること。
また他に必要な単語は自分で補うこと。 以下のキーを使うこと。
Shift + F2 →Diagnosis Window の見方   Shift + F3 →文法情報の見方
Shift + F5 →辞書   Shift + F6 →解説

QUESTION WINDOW

キャンプに行かないことにした。
[decide / camping / go]

I ---

CALIS manipulates many windows. An author can write in the five types of windows below. The numbers in the parentheses are windows of the type.

i. Question Window (1) - the main window of CALIS where a question is given and students answer it. The window is usually on the screen.

ii. Text Window (1) - the window where a fairly long text (story or essay) is presented. The window is usually on the screen.

iii. Direction Window (1) - the window where an author writes the explanation or directions for the lesson. The window pops up first when the lesson begins. Students can make the window pop up by pressing a special key.

iv. Tutorial Windows (10) - a window where an author writes tutorials for the lesson. These windows pop up when students press a special tutorial key.

v. Diagnosis Window (1) - the feedback window which pops up immediately after students input their answer. In a CALIS script, an author can specify correct and anticipated incorrect answers (or their patterns with wild cards). He/She also can connect these designated answers with his/her comments or diagnosis. CALIS checks the student's answer with a list of these designated answers one by one, and if it coincides with one on the list, it makes this window pop up with comments or diagnosis written by the author.

In the exercise, I gave some of the necessary words. This was not a hint for students. Rather I had to do this in order to save authoring labor. If it had not been for these words, I would have been forced to write a huge variety of answers as a correct answer. This is one of the limits of CALL. It is, for the time being, a human job to check free English composition. I limited the words to such substantial words as nouns, verbs, adjectives and adverbs. For function words, CALIS has a list of them in it, and can automatically give appropriate responses to some degree.

If a student types an answer other than the correct answers designated by an author, what CALIS does is :

i. finds the correct answer most similar to the student's input, on the list of correct answers designated by the author, and with this correct answer,
ii. checks the spelling of all the words in the student's answer
iii. checks word order in the student's answer to some extent

And CALIS displays the results as a hint on the DIAGNOSIS WINDOW, together with grammatical categories of the words or phrases used in the correct answer.

To the question above, if the student types, for example, "didn't decide camping go", CALIS will pop up the following DIAGNOSIS WINDOW.

On the window, **'didn't decide'** in ANSWER CHECK is painted yellow, indicating that the student should somehow change these words. The signs in front of [ ] and ( ) in HINTS are grammatical categories. 'Au3' stands for

Au3 (Auxiary Verb Ⅲ)→ 助動詞Ⅲ（助動詞の be, have)
   be   + ～**ing**（現在分詞)→進行形
   be   + ～ **ed**（過去分詞)→受動態
   have   + ～ **ed**（過去分詞)→完了形

'Ed' for past participles and 'Inf' for infinitives. Students can check these signs by pressing the Shift and F3 keys. The following is a part of the tutorial shown when a student presses the Shift and F2 keys.

I 単語のスペルの誤りは以下のように示される。
   赤色の部分 → 削除   反転部分 →訂正
   フラッシュ部分 → 逆順   _（アンダーバー）→ 1文字補足

II 語順の指示
   取消線の単語 →削除した方がよいと思われる単語
   黄色の単語 →修正して使うべき単語
   → が後ろに付いている単語は 右方向に、
   ← が前に付いている単語は、左方向に
   <= => は2語以上の語をまとめて移動
   →← は前後の単語が逆になっている
   ～   は、君が使った単語を
   ^   は、君が使わなかった単語をここに挿入しなければならないことを表す

In the script on the subsequent page, the line followed by the '+' sign is the correct answer. '{ | }' means alternatives, so the correct answers designated by the author are:

a) have decided not to go camping   b) have decided not to go out camping
c) decided not to go camping   d) decided not to go out camping

The lines followed by the '-' sign are anticipated incorrect answers. Here with the wild cards '&' and '*', CALIS displays

the part INCORRECT 1 if the student's answer contains the pattern "any sequence of words followed by 'did' followed by any string of letters followed by 'decide' followed by any string of letters followed by any sequence of words".

the part INCORRECT 2 if the student's answer contains the pattern "any sequence of words followed by 'decide' followed by any string of letters followed by 'not' followed by any string of letters followed by 'ing' followed by any sequence of words".

the part INCORRECT 3 if the two conditions above are not satisfied.

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*****************************
#L26_3
?<CUR:2,0><CLEAR>
?<CE>キャンプに行かないことにした。
?<CE><CY>[ decide / camping / go ] <CY>
?
?<CE>I <MARK: S1><FILL>.
?<CUR: S1>
***********CORRECT ANSWERS
+<=V {decided | (=Au3 have)(=Ed decided)}><=O not <=Inf to {go {|out}>
(=Ger camping)>;
&<FL>GOOD ! <NAME> kun <FL>
&<CORRECT:ALL><TEXT> #L26_3: <CC><LAST>.<CC>
&<TOPLINE:+1>
*********** INCORRECT 1
-& did* decide* &; これでは「決心しなかった」になります。
&  「行かないことにした → 行かないことをきめた」は不定詞の前に not を付けます。
&<SPCK:ALL><TEXT> #L26_3: <CM><LAST>.<CM>
&<TOPLINE:+1>
************ INCORRECT 2
-& decide* not *ing &; decide は目的語として不定詞をとります。
&<SPCK:ALL><TEXT> #L26_3: <CM><LAST>.<CM>
&<TOPLINE:+1>
************ INCORRECT 3
-&;   目的語→不定詞   go ～ing  ～しに行く
&
&<SPCK:ALL><TEXT> #L26_3: <CM><LAST>.<CM>
&<TOPLINE:+1>
****************************
```

In the script, the TEXT WINDOW is used to record and display students' mistakes. By <LAST> command, CALIS automatically writes both correct and incorrect inputs in the window after it checks them. When a student reaches one of the correct answers, CALIS displays praise and all the answers possible, then moves to the next question.

Evaluation

I used drills with CALIS usually in the latter half of the class hour, taking the transfer time from the classroom to the library for a break. In the computer room, I delivered floppy disks to the students as I did handouts in the classroom, and collected them after the class was over. The first time students used CALIS, they registered their names to CALIS so that it could identify their records. When a lesson is over, CALIS displays a score table like:

Date	Lesson	QN	1st	2nd	3rd	TN	Give-up

and saves it on the disk. Here QN stands for the number of the questions in the lesson, TN for the times of tries, Give-up for the times of give-up, 1st for the number of the questions to which the student gave a correct answer by the first try. In order to advise and encourage students, I used these accumulated records.

CALIS has also a convenient mechanism to evaluate students' achievements: you can merge the exercises in each lesson into a kind of database (named 'taskbase' - an exercise is called 'task' in the CALIS language), and make CALIS present the designated number of tasks at random from the designated range of this taskbase. I used this mechanism for testing students' skills after a group of lessons are finished.

Just a final comment

As I have no more space to write, I would like to conclude this paper by just giving a brief comment on one aspect of the INTERNET culture. That is the term 'Copyleft' used against 'Copyright'. Copyleft does not mean to make little of or neglect the authors' rights. It means that with the authors' grants, their products can be used freely for public welfare. TEXTCALIS is a copyleft software, and there are many excellent copyleft computer programs and resources on the NET. I sincerely hope that we, English teachers of colleges of technology, will make use of each other's products, know-how, or methods to collectively create the best educational system for our students.

(Toyama College of Technology)

REFERENCE

WINCALIS HOME PAGE
http://www.lang.duke.edu/