

A preliminary examination of the implications of CAI for teaching English as a second language

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The machine age is upon us, and we are confronted by keyboards and video display terminals in every sphere of our lives. Computers and their flashing, beeping, clicking and whirring accoutrements are a background to our banking, our shopping, our entertainment, and - now - our classrooms. Computer Assisted Instruction (CAI) has become one of the latest in a noble tradition of gimmicks and new approaches, which attempt, with desperate sincerity, to make that most volatile of processes - second language acquisition - predictable and safe and inevitable and easy. As with every innovation, there are two extreme reactions - that of the traditionalists (including, in this case, the machineophobics) who have inherent computer-anxiety, and who maintain that the very nature of language excludes the possibility of it being taught by a machine, that language happens only between people in a 'real-life' setting; and that of the 'bandwagon-groupies', who pounce with enthusiasm upon every novelty, and unselectively and wholeheartedly evangelize the gimmick in their classrooms and to their colleagues, until, of course, a newer one comes along. Both these reactions do a disservice, not only to CAI, but also to ESL students and to the teachers themselves. We owe it to ourselves as ESL professionals to consider

seriously and selectively any and every resource that we can use to make the process of second language acquisition as meaningful, valuable, and efficient as possible.

Wholesale and indiscriminating adoption of any new method is never advisable, just as immediate and unselective rejection of it is unproductive. Any approach or teaching aid has at least some contributions to make to the teaching process. What these are, and how they can best be utilized can only be determined by a detailed and constructively critical examination of the approach. Current attitudes to CAI range from fear to apathy to fanatical enthusiasm, but in this paper I propose to adopt an air of interested neutrality, in the hope that this will allow a more balanced assessment of the uses of CAI for ESL. A comment by Ellen Nold (1975) is relevant here:

A computer cannot substitute for a teacher, just as a book, film or videotape cannot. Nothing can take the place of a good teacher. However, a good teacher can and does use available resources, and the computer - now perhaps consigned to bookkeeping or to drilling or to running regressions - is one such resource. We can say of each good teacher as Chaucer says of his Clerk: 'Gladly wolde he lerne, and gladly teche.'

What is CAI, and what (at present) are the capabilities and limitations of computers? Firstly, and perhaps most unthreateningly, computers are an invaluable aid to teachers in their management of routine instructional paperwork. (This is called CMI - Computer Managed Instruction.) Uses here include the following:

- * Record keeping
- * Inventories
- * Data banks
- * Generation of cloze passages, vocabulary lists, test items, crossword puzzles, etc
- * Word processing
- * Research

Few teachers would argue against the use of such time- and labour-saving devices. Used in this way, the computer can free teachers to devote more of their energies to the creative and satisfying aspects

of teaching. It is CAI proper, the use of computers to take over some of the more 'creative' functions of teaching, that is most controversial. Claims made are that computers can be used for the following teaching tasks:

- * Drill and practice (in all skill areas)
- * Tutoring
- * Assessment
- * Interactive language use
- * Simulations, roleplay, and games

CAI can provide a context in which students interact with appropriately constructed materials, using the target language. The advantages of CAI are not inconsiderable. Firstly, CAI makes individualized instruction possible. A good program is customized to suit the needs of individual students, and is an effective use of each student's time. The level of difficulty, the content area, and the pace can be individually selected and controlled. The student has a considerable amount of freedom of choice, and in this sense CAI can be regarded as humanistic and anti-imperialist in that it enhances autonomy and individuality. CAI is dynamic, it allows for instantaneous variation of content, modalities, sequencing of topics, amount and difficulty level of practice, type of feedback, etc. Students can use what works best for them as individuals and choose activities suited to their particular learning style. Students can also determine their pace and the amount of time they spend in each content area or on any one skill. Because of the one-on-one nature of the format, the student is in effect receiving individual tutoring, and while the tutor has obvious limitations, it is 'especially suited for the patient, repetitious teaching sometimes required to transmit a concept or a skill' (Nold 1975), and is particularly good at saving the teacher tedious repetition of explanations.

Another advantage of CAI is its provision of almost instantaneous feedback. Immediate responses are given to the student's input, and remedial help and guidance can be accessed right there and then. Students thus receive running input and feedback on their efforts, in the sense that the computer is a continuing audience responding as

the student acts. Timely assistance can be given immediately. Scores generated (in response to a grammar exercise, or reading comprehension, for example) give the student a sense of accomplishment and progress. 'Exercises are not secret tests; mistakes are not simple failures but become opportunities for future learning, with instruction aimed directly at the kind of misunderstandings students have exhibited.' (Southwell in Wresch 1984.)

Students who need remediation can review troublesome material as often as necessary, at their own pace. Simultaneously, students ahead of the rest of their class in interest and/or ability can use the computer as a source of additional and/or divergent input. This brings us to the next advantage of CAI, which is its usefulness as an adjunct to normal classroom procedures and materials. Either the computer can provide the drill and practice in routine skills, perhaps lacking in a fluid and spontaneous classroom (and it is surprising how often students demand grammar exercises and rules), or it can provide simulation games, or novel and entertaining ways of practising skills taught in a more formal fashion in the classroom.

An additional advantage to CAI, which I mention with some reservation, is its entertainment value. Computers are a novelty for many students, and the format and approach of much software is aimed at making participation enjoyable and entertaining. Skills are often presented in game format, with reinforcers like graphics, aural signals, and the excitement of seeing one's work lit up on a videoscreen or emerge from a printer. While no method or technique should be adopted solely because students have fun with it, there can be no doubt that student motivation is affected by the amount of satisfaction and positive reinforcement a student gets out of any learning activity. (Michael Southwell's research with basic writers at York College and CUNY indicates that 'students do the [CAI] lessons, and even ask for more. Since basic writing students are typically impatient with, and unsuccessful at, conventional instruction, this seems ... to be clear evidence that they perceive the CAI lessons as beneficial.' (Southwell, in Wresch 1984).)

A further factor worth considering is the growing need for people to be computer literate. Current trends indicate an increasing dominance of computers in even the most everyday of activities, and it is almost certain that the next generation of children will find themselves all but unemployable unless they have some degree of familiarity with and competence in computers. By introducing computers into the classroom environment, we are promoting computer literacy, and encouraging an attitude towards computers that establishes them firmly as a useful device, an aid to human activities, and not as a threat or intimidating and malevolent machines.

What are the disadvantages of CAI? Many have to do with the way that CAI is utilized. No one is suggesting that CAI is a substitute for personal teaching, or that it can replace learning a language in a 'real-life' environment. At its best, CAI is supplementary, an additional source of language input.

Most complaints against CAI are directed against the software currently available. Much of it is firmly in the audio-lingual tradition, structure oriented, and based on the principle that language learning is acquisition of stimulus-response habits. Course material is structuralist, and merely offers manipulation of basic grammatical categories. It deals with language as a formal system of rules and aims to imprint these by offering the syntax and the lexicon, without provision for meaningful, personal negotiation or communication - ie practice rather than use. Very often, however, teachers are successfully seduced into prescribing drills and exercises for their students, the essential triviality and meaninglessness of which are masked by computer-generated enhancements. Most programs involve little more than simple drill and practice, and do not offer the learner the chance to practise or develop higher order skills, or to use the language creatively and communicatively. However, just because most current software is poor does not mean we should reject CAI wholesale. (As Nold says, 'If the computer-teaching programs developed so far are unimaginative and dull, the author, not the computer, must take the responsibility.' (Nold 1975)) There is a great deal of untapped potential in software capabilities, and this can be most constructively exploited.

Given grudging acknowledgement that CAI does have advantages, that we have a responsibility to make use of every possible means of reaching our students, and that most existing complaints about CAI seem to be directed against available software, and not computers themselves, how do we, as ESL teachers committed to communicative, personalized acquisition of language, approach the use of computers in our classes?

There are obvious guidelines, other than our instincts. Perhaps the most basic of these is that 'for language input to be meaningful, comprehensible and challenging, it must appear in a context, in quantity' (Raschio 1984). The quantity offered by a program is seldom a problem, but we need to have ways of evaluating the more nebulous qualities. Interactive language programs should ensure that language use by students is productive as well as receptive. Students should be learning by modelling, not by rules. Because students learn more when they are motivated, active participants than when they are passive recipients, the program should involve them on a level higher than that of mere consumers. Students should be given the opportunity to record, edit, and revise their own language over a long period of time, and to do this in a responsive context. Ideally, the program would provide meaningful practice with structure and the lexicon in a way that contributes to the student's ability to create language.

A good CAI lesson has one specific objective at a time; presents a controllable, well-defined amount of information that can be adequately presented by a learner in a reasonable amount of time; allows student control of the amount and type of material; provides the student with diagnostic and interactive feedback and is able to give prescriptive and remedial advice. (See Appendix C for an evaluation checklist.)

Once a program has passed through the above evaluation, one still should ask whether it makes a unique enough contribution to justify the expense of its acquisition, and the pedagogical risk of prescribing it or making it available for voluntary use by students. The following questions are helpful:

- * Does a particular piece of software do something better than it could be done without a computer?
- * Does it produce learning?
- * Does transfer result from using it?
- * Would you use it if it weren't on a computer? (Kamil, 1984)

I would like to conclude this paper with a very brief indication of some of the types of software currently available in the major skill areas of language teaching. Most emphatically, these programs are not meant to replace interaction of a learner with people speaking the target language (whether these be teachers, fellow students, or members of the target language community). Nor should work on computers be compulsory. CAI is an additional resource, providing students with extra input, with practice, and with the opportunity for enjoyable and successful experiences using the target language in a meaningful way.

SOFTWARE

There is a good deal of tutorial software currently available, much of it designed by teachers specifically for the needs of students. Little of it is directed at ESL students in particular, but nevertheless could be fruitfully used in second language teaching.

GRAMMAR INSTRUCTION

Some of the newest software here is the COMPLAB course designed by Michael Southwell and colleagues at York College and CUNY. COMPLAB consists of five programs, dealing with Noun Plural Forms, Verbs and Subjects, Verb Agreement, Past Tense Verb Forms, and 'to be' verbs. Southwell claims that their approach is developmental, rather than remedial, aiming at creating understanding of the English language system rather than at fixing correct features in isolation. This stated aim tends to be contradicted by the sample transcripts of the programs offered in Southwell's article (see Appendix A) and by Southwell's expressed conviction that

'presenting instruction in bits is the best way to help students assemble a thorough understanding of a complex and interrelated system like written English' (Southwell, in Wresch 1984). The transcript does, however, illustrate the previously discussed advantages of CAI - individual tutoring with personalized pace and input, immediate feedback, and inhumanly patient tuition.

There are a number of other programs which present grammar, vocabulary, and spelling practice. The latter, in particular, lends itself to game format, and two programs currently available (SPELLICOPTER and ATTACK OF THE SPELLING BEES) could quite easily be placed outside a cafe without anyone noticing the difference between them and the other machines. There is always the danger of essential triviality being masked by hilarity, but students who regard correct spelling as a considerable achievement in learning a second language, and teachers who prefer to spend their teaching time working on rather more meaningful skills, will find such programs a happy compromise.

READING

Reading programs are mostly electronic variations on the Reading Lab format (graded passages with multiple choice questions). Speed, skimming and scanning are skills that lend themselves to presentation on a videoscreen, as phrases, sentences, paragraphs and whole pages can be rapidly scrolled at a rate which encourages the student to develop an appropriate pattern of eye movement and holistic perception of phrases. Highlighting of text, flashing cursors, and similar devices make the process of finding main ideas or details very visual, and thus more likely to imprint.

Comprehension questions are usually multiple choice as software capabilities for handling free-form answers are prohibitively expensive at present. The good programs usually allow for some form of interaction, not only telling a student immediately when she has chosen the wrong option, but telling her why it is wrong, and presenting additional clues that will nudge her in the direction of the

right answer. This transforms the multiple choice format from being merely a testing tool, to one that teaches and remediates. Sophisticated graphics in some reading programs allow the use of illustrative material to back the text, and to explain vocabulary (a kind of electronic Illustrated Oxford Dictionary).

Most reading programs assess students for speed and level of comprehension, and students are then given work on an appropriate level of difficulty. The programs also keep student records, automatically presenting the student with work on the correct level or 'promoting' her to the next level on satisfactory progress. Positive reinforcing comments (individualized to use the student's name) and brightly coloured progress graphs help motivation and interest.

WRITING

Writing programs (such as WRITER'S HELPER, BANK STREET WRITER, and HBJ WRITER) offer instruction and assistance in the three main stages of the writing process - invention, drafting, and revision and editing. Invention software includes prewriting activities (eg freewriting, invisible writing, analogies), heuristics (eg tagmemics, Aristotle's Topoi), and planning-outlining strategies. Writing itself is assisted by word-processing software. Mina Shaughnessy observes that handwriting (especially if in an alien orthography) places such a cognitive burden on basic writers that they very often have little energy to spare for the process of making meaning on paper. (*Errors and Expectations* 1971). Word-processing facilitates the process of making script, freeing the student to focus instead on language and meaning. Revision and editing programs offer spelling checks, and tutor in stylistic issues such as sentence length, vagueness, number and type of conjunctions used, sexist language, overuse of the passive, range of vocabulary, the difficulty level (or fog index) of one's essay, and so on. (See Appendix B.)

For beginning writers, there are programs like STORY MACHINE, THAT'S MY STORY, and THE STORY TREE, which offer students a fixed lexicon and the opportunity to combine these words in

creative ways to make sentences and short narrative paragraphs. **STORY MACHINE** illustrates the student's story with moving pictures on the screen as the sentences are composed. **THAT'S MY STORY** also has graphics, and encourages the student to explore divergent lines of plot development by asking questions. **THE STORY TREE** gives a tree-structure analysis of the student's paragraph, depicting the main idea as the trunk, branches for supporting details, and leaves for the examples. All these programs obviously also provide students with printed copies of their stories - an immensely powerful motivator! Suggestions are that these be collected and bound into a regular classroom newspaper.

COMPUPOEM offers practice in parts of speech, and assembles elicited nouns, adjectives, verbs, phrases and so on into short 'poems'. All these programs are immense fun to work with, offer meaningful and communicative manipulation of the language, and add a reality and incentive to the process of writing that may be lacking in the traditional language class.

SPEAKING-LISTENING

Speaking-listening software is still fairly experimental, as the technology to produce and process spoken language is still being refined. Innovative software combines videodisc and voice synthesizers to simulate total immersion in a language situation where the student is involved in a visual-aural-oral interaction. Multiple modalities make the experience far more realistic, and more likely to involve the student in total learning. One program, aimed at teaching Spanish, uses videodiscs and a speech synthesizer to simulate a visit to a Spanish country village, during which the student speaks to and is spoken to by her Spanish guide and the various people in the places she chooses to 'visit' in the village. (Schneider & Bennion, 1983). A similar program for English is a logical extrapolation.

Not explicitly pedagogical, but nevertheless a context for vast amounts of communicative language use are simulations and adventure games that involve students in richly complex activities (playing

detective, hunting dinosaurs, going on a quest for hidden treasure, managing a meteorological simulation, or a simulation of an archaeological dig). Games and simulations can be found based in a wide range of specialist areas (thus appealing to engineering, or commerce, geography or history students). Some adventure games are based on novels (*The Hobbit*, and Douglas Adams' *Hitchhiker* series, for example), and are bound to stimulate reading by creating urgent motivation to do so so (you won't get anywhere in the *Hitchhiker* game, for example, if you haven't read the relevant book in the series to find out what to do with a babel fish!). The games and simulations lend themselves to pair and small group work involving students in a task of interest to them, a task which involves a considerable amount of communicative language use as they tackle such a group project.

CAI offers a number of potentially exciting and profitable learning opportunities, and ESL teachers - if they are lucky enough to have access to a microcomputer lab for their students (and there, of course, lies the rub) - owe it to themselves and to their students to explore the territory and its benefits.

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WRITER'S HELPER (Program) THINK Computers, Aloe Grove, Grove City, Louis Botha Avenue, Houghton Estate, Johannesburg.

APPENDIX A

Below are transcripts of extracts from sample sessions on the COMPLAB program. The student's responses are in italics. The first session comes from a lesson on tenses:

Let's make sure that you know what I mean when I say change tense.

Press RETURN to go on

Tense means time, so when you change the tense of a sentence, you change its time.

Press RETURN to go on

Here's an example.

I go to this college.

What tense is this sentence in, present, or past or future?

> *it's in the present tense*

Good.

PRESENT. I go to this college.

Press RETURN to go on.

Now let's see the same sentence when I change the tense.

PRESENT I go to this college.
 I went to this college.

What tense is this new sentence in, present or past or future?

> *present*

No.

The first sentence was in the present tense.
This one is in past tense.

PRESENT I go this college.
PAST I went to this college.

When I changed the tense, I changed one word in the sentence. What word did I change?

> *you changed went*

I mean a word in the first sentence. Try again.

> *go*

Good.

PRESENT I go to this college.
PAST I went to this college.

We know that go is the verb, because it changed when we changed the tense.

Press RETURN to go on.

Now let me show you the future tense of the same sentence.

PRESENT I go to this college.
PAST I went to this college.
FUTURE I will go to this college.

Notice that the verb changed again.

Press RETURN to go on.

The second sample illustrates part of a lesson on singular and plural subjects.

Now consider this sentence:

Her brother owns four cars.

Look carefully at the subject. Is it singular or plural?

> *plural*

Please check your spelling and try again.

> *plural*

No. Let's review. What word is the subject?

> *cars*

No. You need to start with the verb.

What's the verb in the sentence?

> *cars*

No. Let's review. Type in here how you identify a verb:

> *it changes when you change tense*

OK. So let's rewrite this sentence in a different tense to find the verb.
In the past tense the sentence will begin like this:

In 1970 her brother ...

Press RETURN to go on.

Now you rewrite it in the past tense.

> *In 1970, her brother owned four cars*

Remember, sentences end with periods.
Try again.

> *In 1970, her brother owned four cars.*

OK. Now you know what the verb is since you were able to change it.
So what is the verb in this sentence?

> *it's owns*

Now WHO is owning them?

> *the brother*

Good. So brother is the subject. Now, is brother singular or plural?

> *singular*

Good. We know it's singular because it has no ending. Look at the same sentence with a plural subject:

Her brother owns four cars.

Her brothers own four cars.

The transcript below is from Lesson 5 on subject-verb agreement. The program uses sound to drive home the singular -s ending on the verb.

Consider this sentence.

COOK My husband often ----- dinner.

Before we can fill in the verb, we need to know the subject. So what's the subject here?

> *the subject is husband*

Is the subject singular or plural?

> *it's singlar*

I don't understand your answer. Try again.

> *it's singular*

OK. Since the subject is singular, we'll need to add an S ending to cook:

COOKS

Now listen to the sound of the ending while I say the word.

APPENDIX B

A piece of writing called 'Cartographer' was submitted to stylistic analysis by an experimental program called WANDAH (Writer's Aid and Author's Helper). Below are some of the comments.

Sentence length statistics

CARTOGRAPHER contained 503 words and 25 sentences. The average sentence was 20.12 words long. The longest sentence had 52 words and the shortest had 2.

Your sentences, on the whole, seem neither too long nor too short.

Overall, your paper's sentence lengths vary, but see a sentence length graph for a detailed view.

"Be" verb statistics

10 of CARTOGRAPHER's sentences contained at least one "be" verb (40.00% of all sentences). Overall, the text had 10 "be" verbs.

Although you have not overused "be" verbs in this text, see if you can't replace a few more with active verbs.

Preposition statistics

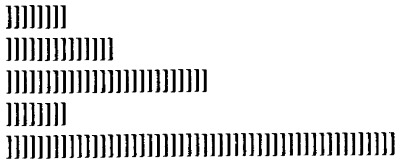
CARTOGRAPHER contained 70 prepositions (including infinitive "to's") in 22 sentences. The text had 1 preposition for every 7.19 words, and an average of 2.80 prepositions per sentence.

Your text may have too many prepositions or infinitives which can create ambiguities and make reading it difficult. Examine your text - you may find better alternative wordings.

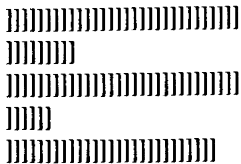
Sentence length graph of CARTOGRAPHER

-----10-----20-----30-----40-----50-----60

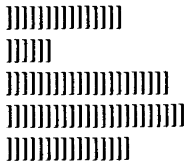
Paragraph 1



Paragraph 2



Paragraph 3



INSTRUCTIONAL DESIGN

Directions

- 1. Are directions shown on the screen and easy to follow?
- 2. Are directions available throughout the program?
- 3. Can the user run the program with minimal assistance?

Screen format

- 4. Is print size and space between lines acceptable?
- 5. Are special text features used to attract attention? (flashing words, underlining, inverse printing, colour?)
- 6. Do graphics enhance the program content?

Rate of presentation

- 7. Can the learner adjust the reading rate?
- 8. Can the learner exit the program at various points?
- 9. Can the learner re-enter the program at exit point?

Learner interaction with the program

- 10. Is required input easy to enter?
- 11. Is positive feedback present and appropriate?
- 12. Is negative feedback present and appropriate?
- 13. Does feedback guide the learner to the correct response?
- 14. Is the number of learner responses per item limited to no more than two or three attempts?
- 15. Are required worksheets furnished?

Linear or branching programming

- 16. If linear, is the content in proper sequence?
- 17. If branching, is it thorough in providing learner options?

Content bank

- ___ 18. Is there a bank of items?
___ 19. Can the teacher add to the bank of items?

Time

- ___ 20. Does the time required for a lesson fit your schedule?

Format of instruction

Format: ___ drill and practice ___ tutorial
___ informational ___ game

- ___ 21. Does the format fit the instructional goal?

Instructional support

- ___ 22. Is the program easy for the teacher to use?
___ 23. Is the hardcopy quality satisfactory?
___ 24. Can the teacher save items into a content bank for later use?

Documentation

- ___ 25. Is a teacher's manual available?
___ 26. Are directions clear and complete?
___ 27. Are program objectives specified?
___ 28. Is the lesson content shown in detail? (vocabulary lists, reading selections, etc)
___ 29. Are sample frames from the program shown?
___ 30. Are needed forms included?
___ 31. Has the program been field tested?

Record keeping

- ___ 32. Can records be kept for an ample number of students?

- ___ 33. Are responses and progress reported in a usable form?
- ___ 34. Can records be printed on paper?

CONTENT

- ___ 35. Does content focus on a specific objective?
- ___ 36. Is the content accurate?
- ___ 37. Does it fit into the curriculum?
- ___ 38. Is the content taught as you want it taught?
- ___ 39. Is it appropriate for the learner's age and ability?
- ___ 40. Are reading selections interesting for the learner?
- ___ 41. Is the content free of racial, ethnic, sexual, and religious bias?

SUMMATIVE EVALUATION

- ___ 42. Does the program deal effectively with the stated objective?
- ___ 43. Does the program support the curriculum?
- ___ 44. Can it be used with the intended age or grade level?
- ___ 45. Can it be used with learners of varying ability levels?
- ___ 46. Can it serve multiple uses, such as introducing, reviewing, or expanding on a skill or concept?
- ___ 47. Does this program present content as well as or better than material already being used?

GENERAL

What are the strengths of the program? _____

What are the significant weaknesses? _____

Describe how the content is presented : _____

Describe how the learner reacted to the program : _____
