Vance Stevens

COMPUTER ASSISTED LANGUAGE LEARNING & INSTRUCTION CONSORTIUM

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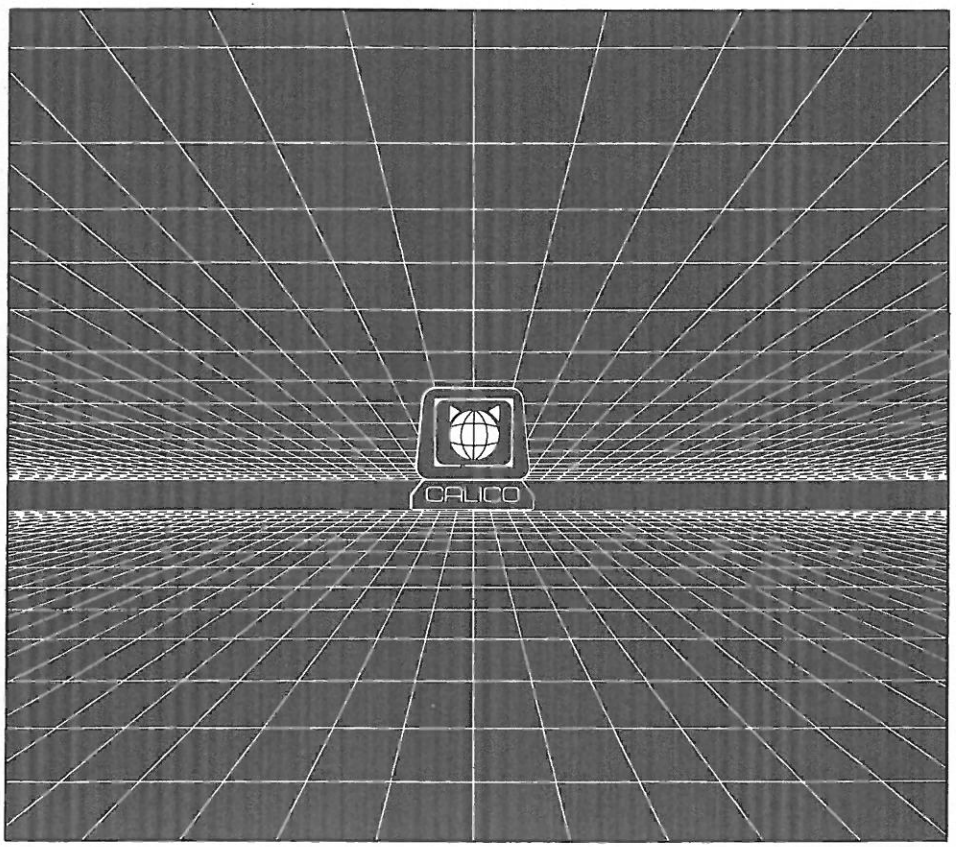

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COMPUTER ASSISTED LANGUAGE LEARNING & INSTRUCTION CONSORTIUM

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FEATURES

DEPARTMENTS

New Ideas in Software Development for Linguistics and Language Learning

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ABSTRACT: *Language teachers and linguists have been developing their own computer-assisted language learning (CALL) software for use in research and language learning. This report describes several such programs which meet a need for communicative, inductively-based software; that are controlled by the students using them; and that can be used as tools in research as well as having applications in the classroom.*

KEYWORDS: *language learning software, linguistic research, software development, inductively-based, student control*

Perhaps the greatest hindrance to widespread use and early acceptance of computers in language learning has been the limited availability of commercial software and the difficulty it has had in meeting the varied specific needs of a wide range of language teachers. Early offerings in the educational software market have often been aimed at the lowest common denominator, and the high price of much software has also restricted its use. A number of linguists and language instructors have been responding to the need for programs that suit their own purposes by creating their own software. What is unique about such software is that it is not created primarily for its marketability, but rather in order to meet a professional or pedagogical need not addressed in available commercial courseware. A sample of this type of software is presented here as an indication of the kinds of programs that several language learning professionals have found useful and practical.

The contributors to this article have either authored or been involved in developing one set of programs described here and have implemented them in instructional settings. The authors intend that the ideas presented in this report might serve as examples or points of departure for other software developers, and thereby suggest ways in which computers can be used in language education as an extension to methods found in currently available commercial material.

1. Gerunds and Infinitives with Stop, Remember, Regret, and Forget

Commercial software publishers are often and understandably reluctant to market software that relies on peripheral devices which users would first have to purchase in order to run the program. Hofstetter (1985) takes the position that greater use of peripherals, such as touch screens and joysticks, allows students to focus all their attention on the screen without having to divert attention away to the keyboard. Although touch screens have been developed for some microcomputers, and joysticks and game paddles are common in arcade games, the commercial sector has been slow to capitalize on such devices for education.

Using Apple PILOT, Vance Stevens has created a lesson to teach choice of complement (infinitive or gerund) after the matrix verbs *stop, remember, regret, and forget.* After any of these verbs, either a gerund or infinitive complement is grammatically possible, but meaning changes depending on which is chosen. These choices have been observed to pose problems for ESL students.

The lesson inductively teaches appropriate choice of gerund or infinitive with the above verbs in a contextualized situation. In the lesson, a character named Max has attended a party the night before. During the course of the lesson, it becomes apparent that Max may have exhibited either normal or perhaps rude and offensive behavior at the party. For example, he possibly *forgot to thank* the hostess, or perhaps he just *forgot thanking* her. If Max was not entirely sober the whole time, perhaps this was because he *stopped to drink* at 3:00 a.m. (when he should have *stopped drinking*). During the course of the evening, he may have either *stopped to talk* to a pretty girl or *stopped talking* to her; the latter being the wisest choice since her husband turns out to be a boxer. In any case, choice of scenario is up to the student, and there are 32 possible scenarios that students may pursue by selecting verb combinations from a chart.

By manipulating the game paddles, students form sentences from a chart of possible sentence components. The chart appears on the screen with the four matrix verbs listed down the first column, and four complements listed in the next two columns: gerunds in the middle column and infinitives in the last. Students manipulate game paddle knobs (or joystick) to make cross hairs meet over their selections, and then push buttons on the game paddles to indicate their selection to the computer. The resulting sentence appears at the bottom of the monitor screen along with a paraphrase or elaboration of the semantic import of that sentence,

followed eventually by questions as to which happened first, the action in the complement or that in the matrix verb.

The lesson is conceived as an attempt to create a lively learning environment for student users by bringing a variety of perspectives (as per Moore & Anderson, 1969), senses (via graphics), and cognitive mechanisms (via the story, puzzle and final recapitulation formats) to bear on the language learning process. The lesson is also designed in an effort to help students become involved in their own learning. It is possible for students to slip through many drill and practice exercises without really engaging themselves mentally (Howe & DuBoulay, 1979), while with this lesson students have been observed to ponder moves at length while trying to predict the outcome.

Mastery of the lesson was tested empirically, and the results suggest that this design is most effective with low-intermediate ESL students (Stevens, 1984a; 1984b).

2. L'Accord du Participe Passe (Past Participle Agreement)

Another disappointing aspect of much widely marketed software is the lack of meaningful feedback provided to the student. User input is often limited to a single keystroke or, where a word or words are allowed, these tend to be judged either right or completely wrong, with little information given as to the reason for the mismatch. Language learners may require more informative feedback; for example, pattern mark-up with proofreader's marks to indicate problems with the answer, as available on PLATO (Hart, 1981) or with DASHER (Pusack, 1982). Pattern mark-up, however, does not provide feedback in grammatical terms where students have been exposed to those terms in the target language.

One CALL program, written for the IBM PC by Lea Penney and progammed by Roger Kenner, aims at tutoring the complexity of past participle agreement in French using a sophisticated system of feedback along lines succinctly described by Chapelle & Jamieson (1983). The system used here, while not actually parsing the students' responses, can produce a detailed grammatical analysis of the answer. For example, the lesson can produce the following diagnostic comments:

- The past participle appears incorrect.
- The agreement appears incorrect.
- The auxiliary verb appears incorrect.
- The pronoun is incorrect.
- The pronoun is wrongly placed.
- The negation is incorrect.
- You do not have enough words.

These comments, of course, appear in French, as does the rest of the material in the lesson. (English translations of key points are available to the student on request.) Learning is thus taking place at two levels. Students are getting practice in monitoring this difficult aspect of the French verb system; plus they are entirely immersed in a target language environment in a manner that focuses their attention on the activity rather than on the language of interaction.

Another issue in CALL is the degree of student control allowed. One occasionally finds commercial software which seems to be based on the use of the computer as a regulator rather than a facilitator of learning. In the Penney & Kenner lessons, progress through the material is completely under the students' control. They can enter any activity or can move backward or forward at will. Students having difficulty with a concept are invited to review the rules and examples for that concept. Once into the grammar section, students can page around at will. At any point, they can decide to try some exercises, and they will be shifted to exercises pertinent to the grammar section they have just left.

3. IPA Tutor, AWFE, Miss Fidditch, and Henry Higgins: Computational Linguistics and CALL

In a different vein from the foregoing, Don Loritz has written four programs designed to explore the application of algorithms originally developed in the field of computational linguistics. The first program converts text to IPA and vocalizes the text via speech synthesis; the second program converts spoken text to its graphic waveform representation; the third program allows a student to try to emulate the waveform graph of a model speaker; and the fourth program uses LISP to parse sentences in English and to deliver a syntactic analysis.

The programs all require an Apple II+ or IIe (DOS 3.3) and a single disk drive, plus additional peripherals and memory as noted below.

Ipa Tutor: The simplest of the four programs, Ipa Tutor, redefines the Apple keyboard to produce IPA characters on the high-resolution screen, and produces the corresponding sounds through a speech synthesizer. The user is prompted to enter free text (appearing in IPA) above a graphics-map display of the IPA keyboard. At <RETURN>, the ASCII codes in a GETLIN buffer are mapped onto the phoneme codes of a Votrax SC-01 speech synthesizer chip (on a board manufactured by John Bell Engineering), and IPA input is synthesized as speech.

Ipa Tutor has been used in introductory linguistics classes and has proved a painless (indeed, even enjoyable) way to learn IPA. Only English can by synthesized, and then only to an approximation of native human English, largely because of the ethnocentric and idiosyncratic "phoneme" inventory of the SC-01 chip. Synthesis quality is, however, adequate to train students in quite narrow "transcription."

AWFE: the Acoustic Waveform Editor: AWFE functions as a storage oscilloscope and as such is primarily a research utility: it digitally records speech input and displays the speech waveform on the high-resolution graphics screen. Cursors can be directed about the screen to make precise timing measurements on the waveform. For example, VOT can be measured to within one millisecond. Additionally, segments of the waveform can be digitally spliced out of the waveform, saved, and/or spliced back into the waveform. In this way, quasi-synthetic speech stimuli such as VOT continua can be created from natural speech.

AWFE uses the Mountain Computer ADA (analog-digital-analog) board, although any similar product with an A-D conversion speed faster than 100 micro-seconds per sample can be used. AWFE requires the computer to be interfaced to standard audio input-output equipment (e.g., a cassette recorder) through an ADA converter.

Henry Higgins: Henry Higgins is a "biofeedback" intonation tutor. It requires 64K of RAM (i.e., an Apple II+ and a 16K language card). Like AWFE, it also requires an ADA interfaced to standard audio I/O equipment. It operates as follows:

First, a teacher digitally records and saves a set of model sentences as a pronunciation exercise. A standard Apple diskette can accommodate approximately 15 2.4-second sentences. Upon entry to Henry Higgins, the student receives standard CAI instructions, and then hears the first model sentence played back. Simultaneously, the intonation contour is mathematically extracted and displayed on the screen immediately below the model contour. The student can repeat the exercise until his or her contour satisfactorily matches the model contour(s). Student responses can be saved to disk.

In pilot testing, it is clear that many native English speakers have difficulty imitating the intonation contours of English models; hence, learners might need to be trained to use Henry Higgins. Henry Higgins can be easily reconfigured to accept live rather than pre-recorded model sentences, thus serving as an enhancement to classroom pronunciation activities.

Charged with the construction of a new admissions test by the director of the ESL program at the College of Marin, Steve Spurling was dissatisfied with the item and test analysis program in use by the data processing department. Therefore, he produced a microcomputerized item and test analysis program that rivals mainframe programs, but which is easier to use and more appropriate to the needs of a small department. Called ANALIT, the program is implemented on an Osborne computer.

ANALIT provides a number of test and item statistics; for example, means, standard deviations, histograms, and correlations. Traditional item statistics such as reliabilities, item-by-option breakdowns, point biserial correlations, and p values are also provided. There is also a module to handle Rasch item analysis. The program produces a person-by-item matrix filled with mean square fits for unexpected responses (Wright & Stone, 1979, p. 74). At the far right of each row of the matrix is each person's raw score, percent correct, the associated Rasch ability measure and the mean square fit statistic, with misfits flagged. Under each matrix column is each item's score in terms of the number of examinees who answered it correctly, the percent of the group they represent, the Rasch item difficulty measure, and the mean square fit statistic with misfits once again flagged. While these statistics may seem esoteric to the uninitiated, to the test developer they provide a wealth of information.

The section of the program used most at the College of Marin is the standardized score placement module. In this module, the two multiple choice sections of the college's admission test are entered item by item. Then the total score for the writing section is entered along with each examinee's name. After all examinees have been entered in this fashion, the placement criteria (cutoff scores and class names) are called up from a separate file and the group is automatically placed into classes with placement listed to either the screen or a printer. The option exists of listing students to separate class files on disk. The examiner can then go back and print out class lists for each instructor as well as an overall placement list. These facilities also exist in a raw score placement module where the same functions can be performed on raw rather than standardized scores.

The bottom line is this: ANALIT makes a difficult and time-consuming task less difficult and less time consuming. It removes one of the chief barriers to the development of optimal language tests--the gap between intuition and analysis. ANALIT is one of a new generation of productivity tools for educators; tools

which should dramatically alter what is possible for educators to accomplish given constraints on time and resources.

6. Interactive Video: CALL Using a Computer/Video Interface

Interactive Video is one of the most exciting areas of development in CALL, albeit one not yet ripe for wholesale commercial exploitation. Interactive video combines the advantages of the learning media of the video cassette (or videodisc) and computer-assisted learning, essentially by means of an interface card. The computer controls the video and guides the student in offering options, allowing input, and reacting to that input. Depending on the student's response, the computer will offer appropriate material (i.e., text or video) for a given level of understanding, ideally taking into account different learning styles. The program should not only guide each student to the best exercises for his or her level, but (in being able to search automatically a tape or videodisc) should also allow a student to go to a particular section of video without having to manipulate the machine.

Truly innovative interactive video implementations require relatively generous institutional backing. Reports of interactive video projects inspired by teachers wanting simply to try out the medium are rare, but often insightful (see Stevens, 1983, for example). Accordingly, an interactive video project undertaking at Hong Kong Polytechnic by Moya Brennan, Eveline Caldwell, Tim Lockyer, and Eddie Tse, is of interest in that it shows a use to which teachers have elected to put this medium when given the opportunity.

In the resulting experimental lesson, a televised panel discussion was used. The teaching materials aimed to help the students to note the form of introductions, to get the gist of arguments, to become sensitive to nonverbal cues, and to interpret the strength of various statements in the discussion. A sequence of presentation was suggested, but the students could choose exercises from the menu and plan their own sequences of instruction.

The materials were programmed in BASIC, which allowed the use of graphics and variety in exercise types. Subsequently, a McGraw Hill authoring system was used with the same materials and, although lesson creation was much less time consuming, the result was less stimulating, visually and intellectually.

The group found that interactive video can be used with groups, but that it also offers effective instructional possibilities for those who cannot attend classes, who prefer a self-paced, private learning experience, or who feel they need more individual

help than they receive in regular classes. But the medium is only as good as the materials which are available, and production of materials for interactive video in particular requires an altered perspective on the part of the language teacher, as well as the cooperation of a computer specialist with an awareness of language learning theory.

7. Summary

The software described here represents the developments undertaken by a particular group of language teachers, all of whom have made some effort to apply computers to their own professional situations, as an alternative to currently available commercial courseware. These materials reflect a search for alternatives to the discrete point drill and practice software often associated with computer-assisted language learning. Furthermore, these programs reflect a desire on the part of some language teachers to have available to them more responsive and inductively-based software which is largely under student control, and a desire on the part of the linguists to have access to software which can be used as a research tool as well as have applications in the classroom. It is hoped that by publicizing this work, further efforts may be inspired on the part of practicing language teachers toward the development of even more responsive CALL software.

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Biodata

Vance Stevens, instructional developer with the Language Centre at Sultan Qaboos University, Muscat, Oman, has designed CALL materials and computer-training programs in Saudi Arabia and at the University of Hawaii.

Steve Spurling, ESL instructor and testing specialist at the College of Marin, California, has taught at Kuwait University, published several articles on microcomputers and testing, and designed a college ESL placement testing package.

Don Loritz, assistant professor of computational linguistics at Georgetown University, has worked in acoustic phonetics and linguistics at MIT, Boston University and the University of Northern Iowa to develop microcomputer speech analysis and parsing systems.

Roger Kenner, director of the Language Laboratories of Concordia University in Montreal, designed and developed the lab's CALL system with instructional modules in several languages, has taught CAI programming and has been a CAI consultant to the Canadian government.

John Esling, assistant professor of linguistics and coordinator of English Language Programs and TESL training at the University of Victoria, B.C., conducts phonetic research and is compiling a Phonetic Data Base of world language on microcomputer.

Moya Brennan, lecturer in English as a second language at the English Language Institute of the University of Michigan, has developed interactive video instruction materials at Hong Kong Polytechnic.

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CALL for Uncommonly Taught African Languages: Computer Characterizations

Gerard M. Dalgish

ABSTRACT: *The field of African language CALL is expanding rapidly as part of the general trend toward foreign language CALL. Yet the assumptions and needs of the learner in such instruction are quite different from that of the more commonly taught languages. African language instruction may not always be classroom-oriented: texts are seldom available for most of the uncommonly taught languages, and a native speaker as consultant*[1] *may or may not have training in foreign language instruction. These factors have led to the need for self-standing, computer-driven instruction for these languages. This paper will discuss some assumptions regarding generative-based African language CALL, with references to Bantu languages and to one particular language (the OluTsootso dialect of Luyai, a language of Kenya), and describe elements of a computer program that produces superficial forms from underlying forms of that language. The paper will close with a discussion of some of the differences between computer characterizations of certain phonological phenomena and the generative linguist's description of such phenomena.*

KEYWORDS: *Bantu, BASIC, generative phonology, Kenya, Olu-Tsooto*

Assumptions Regarding Generativity and CALL

A core assumption regarding self-standing CALL should be the recognition of the value of computer-driven open-endedness in instruction. In addition to the now pedestrian drill and practice or even the more innovative interactive video and simulation exercises, software that can mimic the native speaker's ability to produce any form of the language by means of rules is urgently needed, since instruction for any uncommonly taught language may continue when the consultant has returned to his home country or is otherwise unavailable for instruction. This in turn requires a comprehensive phonological and syntactic analysis of the language in question, and a program that reflects such an analysis.