

Original Paper

## CALL: Computer Assisted Language Learning — A Look at Underpinnings and Origins —

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### Abstract

Computers continues to revolutionize the way we do things. Language teaching, along with most other activities, is being affected by them. This paper will look at how we came to the place we are today by examining the evolution of CALL, computer assisted language learning.

### Introduction

In Paris in 1839, after many years of hard effort with Joseph Niepce, Louis Daguerre worked out a method for fixing an image on a silver coated metal plate. When the historical painter Delaroche saw this miracle of technology, later to be called a ‘daguerreotype’, he exclaimed “from this day on, painting is dead.” The fact is, painting did not die but instead was liberated from its previous role of documenting the ‘life styles of the rich and famous’. It continues to be a major avenue for the creative energies of humans around the world. Interestingly enough, the same prophecy is now being made about photography. The computer has come along to supposedly kill it off. Despite the doom-sayers, photography, like painting, will survive and continue to evolve. Changed, yes, but it will be a vital and compelling part of world culture. What has this to do with the teaching and learning of a second language? Digital technology is going to eliminate the need for wet darkrooms and it will alter dramatically the way in which second language skills are acquired. Change is coming and language teachers should prepare to accept, if not embrace, what is inevitable.

When computers first appeared on the language educator’s horizon in the early 1960’s, the same kind of apocalyptic prophecies were made for the effect they would have on their craft. There would be ‘black boxes’ into which we would speak our native language and out of which would come the target language in near simultaneous translation. There would be subliminal teaching methods whereby we could learn a second, third or fourth language while we slept or meditated. There would be ‘work stations’ at which we would sit and efficiently, effortlessly, acquire any language through the mediation of a friendly computer; one that ‘knew’ just the right things to say and when to say them, was never judgmental and always gave you an ‘A’.

In the process of ‘going digital’, it was feared teachers would become expendable, replaced by software that never needed a sabbatical, only an occasional upgrade. There are administrators for whom this seems a compelling option. Teachers, like most other humans, will react with apprehension when their livelihood

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is perceived to be threatened. So, instead of looking realistically at what advantages there might be in technological breakthroughs, they refused to consider changes in their teaching styles. Administrators, on the other hand, pressed by the need to keep their schools brochures ‘sexy’ with lots of pictures of happy students at computer stations, allocate more and more funds toward the purchase of expensive hardware that seems to become outdated before it is operational. Teachers, faced with a bewildering array of platforms and software and pressed on all sides by escalating demands, cannot find the time to master these new tools much less build new curricula around their uses in the classroom. On top of all that, there is the institutional resistance to providing regular and sustained access to computer facilities for language classes. The demands for time in the computer labs are great and growing as the importance of things like the Internet and the World Wide Web spreads across subject areas.

Change is upon us and, in order to help understand how we got here, this paper will present a look back at some of the landmarks we have sped passed on the information super-highway.

### CALL: Theory and Practice, a Brief History

In order to put contemporary practice in perspective, we need to locate the theoretical underpinnings of the origins of CALL. To do that we will begin with the 1950’s and 60’s which was dominated by the thinking of the behaviorist psychologist B. F. Skinner. Language teaching at the time was characterized by pedagogical audiolingualism, psychological behaviorism, and linguistic structuralism. These three mutually supportive schools of thought were derived from Skinner’s book *Verbal Behavior* (1957). The central tenet of his behaviorist theory, that of the stimulus, response, and reinforcement loop, had a profound influence on language teaching. It continues to this day especially in the widespread introduction and use of language laboratories. According to this behaviorist model, students were to “learn the target language by the process of habit formation, that is, practice”. [1] This is the method now called by the language teaching cognisetti, contemptuously, ‘drill and kill’. It is also referred to, less pejoratively, as the ‘PPP Method’ (Present, Practice, Produce).

Skinner was also very influential in his belief in the efficacy of programmed instruction via the use of various teaching machines. He advocated their use for individualized instruction because they were responsive to the different pace at which student’s acquire language. They can also give immediate feedback to student’s input. This kind of feedback-loop was very important in early CALL programming. Two of those early projects were PLATO (Programmed Logic for Automatic Teaching Operation) and the TICCIT Project (Time Shared, Interactive, Computer Controlled Information Television).

The first of those, PLATO, is usually given as the first attempt at CALL. The initial version, according to Levy [op cit.], was written at the University of Illinois by Don Bitzer in 1960. It has gone through four successive rewritings. It was designed to provide interactive, self-paced instruction for large numbers of students. Some of its interesting innovations were:

- communication between users in the form of notes,
- a kind of email system that was a primitive ‘chat-room’,
- a note system that could be sent to everyone signed on as is done in listserves now,
- student records could be maintained for the students information,
- records could also be maintained to facilitate research on the effectiveness of the teaching methods.

From the start, PLATO was recognized as not being the total answer to a language student’s needs. It did some things very well, primarily pattern practice and writing skills development. It did not attempt to deal with the necessary practice in speech production and listening comprehension. As described by Hart,

the PLATO philosophy towards writing instructional material for language learning is as follows:

There are two basic approaches to authoring CBI (Computer Based Instruction). One, which might be termed the 'paradigm' method, provides a set of prefabricated instructional formats (e.g. matching, multiple-choice, paired association drill); the author's task is to fit content into these schemata as parameters. The other provides a 'toolbox' of general capabilities which the author can use to construct whatever instructional designs he/she wishes. The latter is much more powerful, but also requires more of the lesson author.[2]

The applications were written using an authoring language called TUTOR which Hart describes as being a high level system using the 'toolbox' approach. What is significant, in my opinion, is that the computer literate language teacher using this authoring system was able to write their own CALL materials for their own classrooms as opposed to it being done by commercial entities. On the other hand, language teachers needed to be computer literate to participate.

The TICCIT project was developed at Brigham Young University (Salt Lake City, Utah) and combined television with the computer. It could be considered the first 'multimedia' language teaching package. It differs from the PLATO system in that the software and courseware are delivered as a package so that teacher input is not possible or necessary. What is significant is the fact that the student is able to select the presentation mode and the pacing of the presentation. The learner can select from special keyboard keys marked Rule, Example, Practice, Advice, Objective, Easy and Hard. The instructor would be able to stipulate the content of the lesson but not the strategy by which this content was delivered.

Evaluation of these two major CAI (Computer Aided Instruction) projects showed that they were popular with both students and teachers but that the long term results were not edifying. It could not be proved that either had much effect on the acquisition speed or retention of second language skills. According to Hofmeister and Maggs [3], there are three important findings to be gleaned from these two projects: first, because of the wide differences in results, care must be taken in generalizing from one CAI project to another; secondly, careful monitoring is necessary to assess the reasons for attrition; and, thirdly, CAI that teaches along with a conventional instructor is of value, especially in areas where specialist teachers are unavailable.

The 1970's, in general, was a period of moderate growth with some disappointment as projects faced the evaporation of government support. The raising costs of the war in Vietnam and its aftereffects tended to limit funds to things that were seemingly more pressing.

"The period was also dominated by the audiolingual approach to language teaching but by the 1980's a different view was taking hold." (Levy, 18)

At the beginning of the 1980's the behaviorist model of language teaching began to lose favor. Teachers began to understand that language acquisition was more complicated than simply providing more drills and more pattern repetition. The needs of the individual learner began to be looked at using different models such as Community Language Learning (Levy, 21) and Total Physical Response (Levy, 21).

"Humanistic methods and techniques engaged the whole person, their emotions and feelings, the affective dimensions. But the most far reaching approach to language teaching to emerge at this time was Communicative Language Teaching (CLT)." (Levy, 22)

CLT is characterized as an approach, rather than a method, which "aims to (a) make communicative competence the goal of language teaching and (b) develop procedures for the teaching of the four language

skills that acknowledge the interdependence of language and communication”[4]. This is a significant departure from previous mechanistic models putting communication and the learner in place of testing and the teacher. This model continues to have an important place in contemporary thinking and perhaps deserves even more prominence here in Japan with its deadening dependence on rote learning and testing to evaluate student performance.

Along with the changing theoretical base in language teaching, computing was also in the process of experiencing a sea-change. The first Apple with its revolutionary GUI, Graphical User Interface, was released along with versions of cheap personal computers made by Tandy, Commodore and Radio Shack.

The early 1980’s also saw a boom in CALL literature addressing the emergence of the personal computer as a learning tool. Along with these two events a new kind of teacher was born, the teacher/programmer. With a personal computer and a knowledge of a programming language like BASIC, the language teacher could begin to provide his/her own CALL materials. Prior to the development of the personal computer, the difficulty of programming had kept CALL material development in the hands of professional programmers. Further developments, specifically the release of HyperCard for the Macintosh in 1987, had a tremendous effect on the development of CALL materials. Another example of software that had a great influence on materials development was Storyboard for DOS based machines.

Other significant developments in the software arena were the various word processing programs that were released like Wordstar, MS Word, and WordPerfect. All of this combined to make the 1980’s an extremely fertile period for CALL development. Nonetheless, there was considerable criticism of CALL because of the changing theoretical base that had emerged. CALL materials were seen as being too mechanistic and as not being suited to the more humanistic and communicative model being espoused at that time. The research on CALL practice was summarized in 1988 by Pederson as follows:

1. Meaningful (as opposed to manipulative) CALL practice is both possible and preferable.
2. The way CALL is designed to encourage the development of language learning skills can result in more learning.
3. Learner differences can be documented easily and accurately through a computer tally of interactive learning strategies.
4. Learner differences can affect learner strategies, learner gains, and attitudes in CALL.
5. Students tend to demonstrate a more positive attitude towards CALL materials written by their own instructors.
6. Language instructors need to develop strategies for maneuvering effectively within the culture of the learning laboratory and the educational institution in order to secure needed computer resources.
7. Despite the enthusiasm of language teachers already using CALL, many language teachers are dissatisfied with existing software and desire training on how to integrate CALL into the existing curriculum[5].

### The Present and Beyond

These findings continue to be generally true. There is no longer any doubt that integrated CALL materials can be an important addition to second language acquisition. Its ability to respond to the needs of different learners is critical. It is also important that teacher training be available so that CALL materials can be integrated into the whole process of language acquisition. Regular and continued access to computer facilities is also necessary.

As to the continued development of CALL materials and use, there is almost universal agreement that the

explosive growth of the Internet and the World Wide Web is the most significant events of the 1990's with the increased access to materials, people and learning environments they provide. These events are of great interest beyond the world of language learning and the history of how it came about is available elsewhere (<http://www.isoc.org/internet-history/>), but the release of Mosaic, the first easy to use web browser, and its successor, Netscape Navigator, must be marked as one of the most important events of the decade. Having an easily used interface and access to the world's information will continue to revolutionize our lives.

Email is another aspect of this revolution that is very important to the continued development of CALL.

It points to language learning beyond the offerings of the institution, and highlights learner, and, in fact teacher, autonomy. Interactions may be determined more by individual ideas about how language is learned, and through mutual negotiation and agreement, rather than ideas more formally received...Such modes of operation emphasize the emancipatory qualities of technology in bringing more options to the learner to access language learning opportunities, perhaps entirely outside more traditional institution-based environments. (Levy, 34)

Besides changing the roles students and teachers will be playing, the internet is a dynamic entity. It is a storehouse for materials and archives that can be accessed from around the world. These materials cannot only be viewed but also downloaded, printed and spread from the site of download. There are dictionaries, encyclopedias, ESL chat rooms as well as multimedia CALL applications. Distance learning is coming into its own with advanced degrees available online. For more basic ESL needs there are email listserves that link language learners who can communicate with native speakers via the internet. Students can then participate in authentic communication about subjects of mutual interest with or without teacher moderation.

A variation of this type of interaction is the discussion list in which the subject is posted and the students contribute to a forum using a listserve and email. As this kind of group has evolved, new learning environments have been created. Examples are: MUD ('Multi-user Dungeon'), a group of role-playing games modeled on the original 'Dungeons and Dragons,' MUSH ('Multi-User Shared Hallucination') which is similar to MUD but more complex in its use of symbols, and MOO ('MUD Object Oriented') which is similar to MUD's but the user is able to help build the environment. Generally, email and the internet makes possible the interaction of people in a new way both locally and at a distance.

A complex aspect of CALL development in the 1990's was evaluation. New technologies, new versions of software and variations of hardware are being introduced at a dizzying speed. Applications that needed sophisticated knowledge to be produced are now within the capabilities of a more general group of workers. For example, web pages that were constructed using complex hypertext tag writing can now be done using "drag and drop" WYSWYG ('What you see is what you get') software. Despite the variety and complexity of the job, evaluation of this new software is critical and the development of theoretical benchmarks continues to be very important.

It is an exciting and challenging time to be a language teacher. The tools becoming available to us are rapidly expanding. It is important to remember, despite the mechanical nature of these digital helpers, the goal is to allow students access to the world outside their native cultures so they can communicate meaningfully with their fellow humans around the world. It is person-to-person and not machine-to-machine. It is also important to remember that staying current in our field needs the support of the institutions for which we work. Language teachers need access to computers for research, preparation and presentation.

### Some Useful Web Sites for ESL Teachers

<http://www-writing.berkeley.edu/cuttingedge96/>  
<http://webster.commnet.edu/HP/pages/darling/grammar.htm>=tests and other activities  
<http://www.lang.uiuc.edu/r-li5/esl/eslsites.html>=sites collected  
<http://www.faceweb.okanagan.bc.ca/toefl/index.html>=TOEFL prep on-line  
<http://www.pacificnet.net/~sperling/eslcafe.html>=much to do there  
<http://www.tcom.ohiou.edu/OU Language/english/index.html>=resources page  
<http://www.jaist.ac.jp/%7emark/callinks.html>=from above a list of sites on CALL  
<http://www.aitech.ac.jp/~iteslj/links/TESL/>=links for teachers  
<http://www.englishtown.com/English/default.asp>=online school, a pay site.  
<http://www2.gol.com/users/rsdavis/cyberlab/>=multimedia listening  
<http://langue.hyper.chubu.ac.jp/jalt/pub/tlt/96/dec/index.html>=JALT page  
<http://www.zip.com.au/~pronounce/>=software for pronunciation

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