

**Computer assisted language instruction :
fifteen theses**

by

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During the past year I have had the opportunity to examine several Computer Assisted Language Instruction (C.A.L.I.) systems. I could see students working with all kinds of them ; most of what I saw looked extremely inefficient, and, was composed of particularly tedious and boring pattern drills. Astonishingly enough, the students actually seemed to like those teaching programs and the language instructors were very happy with their systems. In fact the most sceptical remark I ever heard amounted to something like : " ... well, it is kind of boring sometimes, but anyway, we like it a lot better than conventional classroom teaching" — which ought to make the language instructors reflect on their approach to language teaching. On the other hand, such experiences urged me to meditate about computers and their contribution to language teaching, for, even though we have the equipment now, we apparently do not know how to use it efficiently.

This is basically due to a lack of theoretical insight ; libraries are stacked with systems' descriptions, but studies on the theoretical foundations of Computer Assisted Instruction are rare. Therefore these reflections on C.A.L.I. cover its present and future status, its market, teaching strategy, teaching methodology, software and hardware needed. Without any doubt, the computer has already conquered its place in language instruction, and if C.A.L.I. wants to be taken seriously, we better implement it on a solid theoretical basis.

I. C.A.L.I.-- Status

Many of the things we do with computers are direct descendants of traditional applied linguistics, only now the equipment we use is more sophisticated and faster. In the same sense C.A.L.I. is a child of traditional programmed language instruction.

Language learning is mastery of a cognitive skill, a process which involves the graceful interaction between all the components of the Foreign Language Teaching Model, including the programs, methods, objectives, equipment, tutoring and language practice. Traditional programmed instruction has never claimed to play the role of a full scale F.L.T. Model ; it rather considered itself as a useful though imperfect substitute for some of the components of such a model. As computers became popular in linguistic and literary research, programmed instruction gradually had to give way to C.A.I. ; only now — with so much enthusiasm clouding this new and exciting device — some users forgot that language learning involves more than mere drill and practice.

In order to individualize the teaching process — one of the pretended trademarks of C.A.I — the objectives and the programs and methods used must in an ideal environment be determined in close interaction between the teacher and the learner. If the teacher is replaced by a C.A.I.-system, to do so would require a system which relies heavily on Artificial Intelligence models of language understanding, perception and deductive logic ; and this to an extent unimaginable for the time being. The manifest absence of such A.I.-models implies that C.A.L.I.-systems as such can not assume the role of the teacher efficiently.

THESE 1

A purely C.A.I.-based language teaching system, which is at the same time teacher independent and efficient, is not foreseeable in the near future, if ever.

The truth of this these is so evident that nobody has ever even questioned it. However, as one of the causes and incentives for C.A.L.I.-systems development is lack of staff, C.A.L.I. often results in considerable reductions of teacher contact hours. In its extreme form this interpretation of C.A.L.I. leads to a situation where a language course is chopped into very small chunks of information, which the system then feeds to the learner ; language practice is effectuated by pattern drill exercises. Occasionally a teacher is present to resolve the students' difficulties which the system is unable to handle. This interpretation of C.A.L.I. degrades the human teacher to a servant of the all-powerful machine. Obviously, such an F.L.T.-model does not teach or instruct, for the machine lacks the deductive power to take into account the individual learners' problems and the human teacher lacks the necessary information to diagnose them. Therefore it should be obvious that the F.L.T.-model benefits from a close interaction between the teacher and his C.A.L.I.-system, provided that the teacher-C.A.L.I. relationship is interpreted correctly.

THESE 2

Any realistic application in the field of C.A.L.I. will strive towards machine-aided human teaching, rather than man-aided C.A.I.

What this simply means, is that *teaching* is man's business and that the machine can only play a marginal, complementary though useful role in this process.

II. C.A.L.I.— Market

Libraries are stacked with systems' descriptions ; therefore we consider the market as "rich", for "demand" and "offer" interplay quite well. Although some enterprises SOCRATES and its much more celebrated relative PLATO, were conceived to be general purpose systems, it should be remarked that each system is better suited for specific applications and less manageable for others. In language courses the objectives range from "basic principles" over "language for special purposes" to "proficiency level" courses in various degrees. What we see today, is that the C.A.I. market is flooded with systems, all different from each other, each with very specific goals and functions, each with weak and strong points. One general purpose system, PLATO, is conquering a market of its own, but in principle, most general purpose systems will be very uneconomical because of high development, installation, exploitation and maintenance costs, in terms of man-hours, software development and teacher training. A detailed comparative cost analysis of PLATO should be required.

THESE 3

A realistic present-day C.A.L.I.-system must be tailored to the specific needs and characteristics of the subject matter to be taught.

As yet it costs less to run a number of specific purpose systems at a reasonable price rather than one all encompassing general purpose system at — often unsurmountable — expenses in terms of man-hours and computing.

As cost-price is an important factor —if it were not we would be able to assign each learner a private language teacher — success of C.A.L.I.-systems is related to the degree to which prices can be forced down. To do so we must not stereotype teaching strategies, but we should spare no effort to make our systems available at any installation. This involves a lot of hard work from the side of the computer scientist, for he must develop a software which is at a time as universal as possible and easy to learn by a non-trained user.

THESE 4

Ideally, a good C.A.L.I.-system must be fully portable, i.e. its availability must be guaranteed at any installation at low installation and exploitation costs.

III. C.A.L.I. — Strategy

But not only the computer scientist has to make an effort ; is it not true that we all know analysts and programmers who are able to produce a system which is exponentially better than the average we see in daily life. This leads us to conclude that language instructors tend to use only a fraction of the potential the equipment offers, and coupled to that, only a fraction of the investment and the underlying philosophy really pays off. How many teachers do not satisfy themselves with the selection of a nice programmed instruction book, having it put on a peripheral device and then start using naive C.A.I. programs to "turn the pages" of the book. Such an approach has nothing to do with individualized teaching, it only means that the learner is left to his fate.

THESE 5

C.A.L.I.-systems which are nothing more than "a-book-put-on-a-computer" are basically bound to fail. In contrast with the classic textbook, computers can store teaching materials in an n-dimensional way. This allows for multiple access and exit points as well as rapid decision taking on the basis of manifold parameters. Provided that the full potential of the computer is used, the language learner will not be let to sink or swim but may benefit to the utmost from the characteristics of the medium.

THESE 6

All successful C.A.L.I.-systems will eventually have to take an approach which ensures full usage of the medium, i.e. dynamic interaction with the trainee, rapid diagnostic decision taking, flexibility and individualization of the teaching process.

Basically computers do only two things : they transfer *data* from one device to another one (I/O operations) and they produce new *information* on the basis of data received from a peripheral device and the criteria laid down in an algorithm (computing). Just as in other fields of the humanities, a lot of computer people tend to exaggerate work on I/O aesthetics ; it seems to be an established tradition in C.A.I. that "learners must be comforted with confidence building remarks". Do most C.A.L.I.-sessions not begin as follows :

- Hi, I'm NAME-OF-THE-SYSTEM (preferably a familiar sounding acronym), what's your name ?

which leads the surprised novice to conclude that 'this computer is almost human'. The 'computer' improves its image even a bit more by its traditional second remark, which usually sounds like :

- Well, NAME—OF—LEARNER, let us see how you handle TOPIC—OF—LESSON

and when the learner gives a wrong answer

- Oh, that wasn't quite what I expected, NAME—OF—THE—LEARNER, but don't worry, I'll help you to get it right.

All such remarks are intended to consolidate the learner's confidence in the teaching system, even to the effect that the 'computer' is endowed with characteristics which are a lot nicer, friendlier than those of the learner's habitual teacher.

Furthermore, many makers of C.A.L.I.-exercises believe obstinately that every sentence, every line, every remark has to relate a joke, a pun or a curiosity. May be all this is the very reason why so many students like those boring systems ? On the other hand, many C.A.L.I. people seem to have no time to look for adequate methods of computation to measure the learner's effort, progress, weaknesses, etc.

THESE 7

Many makers of C.A.L.I.-systems tend to spend more time and effort looking for playful texts and examples, rather than working on the structure of their language course. As the particular C.A.L.I. environment already confronts the learner with sufficient distraction sui generis, the learner's attention must be caught by the language course, rather than by a superficial effort to "humanize" the machinery. Boredom and lack of concentration must be avoided by the intrinsic qualities of the language course.

Moreover, we may not forget that — apart from the learner — the major protagonist in the whole process is the teacher, a person of flesh and blood. It is the teacher who may notice at a glance that "his student" is underperforming, or suffering of stress, or just tired. He may even have a guess, and thus understanding, regarding a poor performance. There is little doubt that the computer ever will.

THESE 8

A good C.A.L.I.-system does not compensate for a bad teacher ; it can, however, add to the charm and effectiveness of the work of a good one.

IV. C.A.L.I. — Methodology

For any C.A.L.I.-system to perform the way we would like it to, several conditions must be fulfilled. First of all, it must "know" its students, i.e. keep a record of each individual's strengths and weaknesses, priorities and restrictions, motivations and abilities. I call this kind of record the student's *profile*. Secondly, as any teacher knows, repetition is a key concept in learning. But not every individual has to rehearse the same matters again and again, exactly because of differences in profile. What is more, the individual itself may turn out to be a very poor judge about his or her capabilities and performances. Furthermore, recapitulating, rehearsing ought not to be a stupid, parrot-like repetition of concepts and words, but must be a spiraling activity, in the sense that, depending on progress made or evident mis-

miscomprehension, a specific path must be determined up or down the scale along which each concept is organized. Finally, if a activity has to be repeated, everyone will loose interest unless formats, formulations, examples and exercises are modified with respect to the student's case history.

THESE 9

In order to let the learner perform in an ideally individualized environment, a realistic C.A.L.I.-system must keep a record of each learner's profile — not just his scores — and update it after every session.

THESE 10

Frequent interrupt points in a highly structured C.A.L.I.—course must allow for sufficient forward- or back-looping so that each learner can attend the course at his own pace.

THESE 11

If a learner has to loop back, the system must have adequate facilities to provide him with alternative examples, exercises and differently formulated texts. Long- and shorthand versions of explanations, rules and definitions must be available. All this is, of course, only possible, if the system keeps a record of current and preceding sessions.

V. Software

It would be incredibly unfair, however, to put the blame for mediocre C.A.L.I.-systems entirely or even part of it on their users, who have — to say the least — not been given the appropriate tools to work with. In this respect, it is particularly the development of a high-level, special purpose software, which is an indispensable prerequisite for successful C.A.L.I. Such software already exists ; for example TUTOR, the software used in PLATO systems, would meet many of the conditions we would like to see fulfilled, but, unfortunately, it seems that in order to get TUTOR, whether you want it or not, you may have to acquire the whole lot of PLATO together with it.

THESE 12

Data-structures must include complex data-types like trees, graphs, substitution tables and iconic representations of language information.

THESE 13

Information-structures must include ATN's or similar structures to represent at least the macrostructure of the C.A.L.I.-course ; they must also allow for high-level programming, including multi-tasking and non-deterministic programming.

VI. Hardware

One recurrent question in circles of computer people concerns the machines. What is the best machine to work with ? Which configuration will suit our ends best ? Do we better stick to our large mainframe or should we change over to a microcomputer ? In fact, after having worked with some 7 or 8 different computers of various brands and sizes, I do not think these are the important questions. Preferences are real but often subjective.

THESE 14

In principle any computer configuration may be acceptable for successful C.A.L.I.-application. Evidently, a large mainframe with a number of terminals linked to it may have longer access times during "peak hours", whereas an independent microprocessor might not have enough storage capacity. The ideal configuration for the time being seems to consist of a large or medium-size mainframe to which a series of intelligent terminals or microprocessors are linked.

What is more important concerns the hardware we do not have at the moment. How much nicer would our work be if we were just able to extend our scope beyond the written word, and, for example, also practice the first two basic skills in language learning, *listening* and *speaking*. How comfortable would our life be if we had a simple, cheap device that allowed us unlimited *visualization*, a device that would project a video disk on command of the computer. What if we could integrate the kind of drawings, sketches every teacher produces during classroom teaching to visualize a concept, or if we could let do exercises with such pictures.

THESE 15

Of the four basic skills : listening, speaking, reading and writing, only the latter two can be trained efficiently at the moment. If we envisage a 'hybrid' configuration with audio-visual equipment the first two basic skills might be practiced as well during C.A.L.I.-sessions.

I am not a computer scientist or technician, but is it overoptimistic to believe that such a hybrid computer with audio-visual equipment is technologically feasible ? If some simple technology could give us this kind of machine, then I think, C.A.L.I. still has a bright future.

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