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Computer-assisted language learning (CALL)

This article is the result of my readings on CALL and of a research trip I was recently able to make to Canada. The latter enabled me to speak to colleagues from a variety of institutions[1] where CALL has been in use for many years (with the resultant accumulation of vital experience in this domain) and where research on the preparation of CALL materials is being actively pursued and resulting in the production both of interesting materials and of systems that aim to help the non-specialist in computer programming to prepare CALL materials without the aid of a programmer.

The main focus of my interest during my trip was only one of the possibilities of using computers, namely their use as a teaching/testing/exercising medium, usually in the context of a course that is also taught by a teacher (literally, computer-*assisted* language learning). I did not set out to examine in depth other applications, such as management of students' performance records, etc. by computer, which can be a great time-saver when one is dealing with large numbers of students (sometimes referred to as computer-*managed* language learning).

There is a gradual (and probably quickening) awakening to the fact that computers could play an important role in language learning. However, it is probably true to say that the majority of language teachers are unfamiliar with CALL and its possibilities, either through lack of opportunities to become better acquainted with it or through a desire not to do so, usually based on ideas about languages being humanities subjects and therefore unsuited to computer applications. Such a position is largely based on prejudice and ignorance of what computers can already do, coupled in many cases with a fear of innovation and especially of computers.

In fact, CALL has much to contribute to the learning process, including:

a) interaction between learner and computer, with instant feedback being available on answers the learner supplies;
b) highly individualised instruction, since the shape of the lesson can be determined by each individual student's needs;

1 I spoke, *inter alia*, to colleagues, from the following institutions, and saw samples of most of their work: Université Laval (Québec), Université de Montréal, Concordia University (Montreal), Université d'Ottawa, Carleton University (Ottawa), Algonquin College (Ottawa), University of Guelph (Guelph, Ontario).

c) instruction that is more truly student-centred than most, since the speed of the lesson can be determined by each student individually;
d) at least for the moment, computer-assisted instruction (CAI) can be very motivating, though this effect may pall as the novelty wears off (arguably, though, it may even increase as programs become more sophisticated).

Before I turn to software, lesson design, etc., it is necessary to look briefly at questions of hardware, since there is, unfortunately, a state of semi-chaos in this area at the moment, and this has repercussions on software, especially on its exchangeability between systems.

Hardware

With the arrival on the scene of the microcomputer, two different types of system were created, namely those based on a central computer to which a varying number of terminals is connected (terminal-based systems) and those composed of group of independent microcomputers (microcomputer-based systems). In fact, there also exist kinds of hybrid systems where, for example, a group of microcomputers can be managed and monitored by a microcomputer, to which all the others are linked; it is also possible to «download» from a central computer on to a microcomputer, which can then function independently.

Terminal-based systems

These are the older systems, and are exemplified by the PLATO-system, which consists of a very powerful «mainframe» computer, to which up to 600 terminals can be linked simultaneously anywhere across a continent. All materials are stored in the mainframe computer, and the terminals are totally dependent on it, so that, if the computer «crashes», nobody can work, anywhere. Logging-in can also be a tiresome and frustrating process, and the link to the computer may not be totally dependable or may only permit rather slow transfers of data.

A similar system on a smaller scale can be created, based on a minicomputer capable of taking, say, 100 terminals. Such systems are usually confined to one campus and are not easily accessible from other locations.

In favour of mainframes and minis, it should be pointed out that «down» time on properly maintained systems that are not over anti-

quated tends to be minimal, and an efficient connection to the terminals can usually be arranged. Furthermore, both provide the very useful (if not almost essential – opinions are divided!) facility of file-keeping, thus enabling teachers to monitor very precisely their students' performance. Also of some significance is the fact that mainframes and minis are maintained and run by a group of specialists, a fact which allows the teachers to concentrate more on pedagogical and lesson-design questions. It is also relevant that terminals are relatively indestructible, trouble-free and not likely to be stolen, so they can largely be left to look after themselves in an open-access, unsupervised room.

Microcomputer-based systems

These systems consist of individual, independent microcomputers, each with a keyboard, a TV monitor and a disk drive. The latter is necessary because lessons are stored on diskettes that usually measure some 12 cms in diameter. All that one needs in order to start work is the hardware, a diskette and a power point, which means that these systems are much more mobile than their competitors. They are, of course, vastly cheaper to buy and can be built up gradually, as funds permit. Microcomputers also offer colour as a standard feature, while few terminals linked to mainframes or minis do so as yet (the need to have colour available is also a point on which teachers disagree, though everyone is clear that one should not overdo the colour virtuosity).

In favour of microcomputers, the following points *inter alia* can be made:

1) they are cheaper to buy and can be used independently of a computer laboratory.
2) if one breaks down, the rest are unaffected.
3) they are mobile
4) provided one's colleagues elsewhere use the *same* microcomputer, the exchanging of programs is perfectly straightforward, and, in any case, increasing amounts of CALL materials are being produced in this format.

Perhaps the single most negative feature at the moment is the relative fragility of the diskettes and their low density of information storage. Both these defects should be remedied in the next two or three years, as should the fact that mainframe/mini systems are usually more powerful and can thus offer the student a whole battery of aids that microcompu-

ter systems are only just beginning to offer. Also, at the moment, it is considerably more difficult, with microcomputers, to keep track of students' work and performance.

Despite their differences (which will probably tend to blur, due to such features as down-loading from mainframes to microcomputers), both types of system offer most of the advantages of CALL, so a decision between them must rest on criteria of another order, such as the available financial resources, what else is being done in CAI in the institution concerned, what precise use of CALL is foreseen, the quality of service available (mainframes and minis require high-quality servicing), etc. There is, however, a major factor which must be borne in mind and which *could* influence the choice of hardware, and that is the whole question of availability of software for the machines being considered.

Software

By software is meant materials for use as CALL lessons, and I shall begin with off-the shelf materials. Here, the situation is, unfortunately, even more chaotic than that prevailing in videotaped materials, since there is very little transportability from one computer system to any other. This means, that, as a rule, materials written in computer language A for computer system X will not run on any other system. Equally, materials written for mainframes are very unlikely to run on microcomputers, and, sadly, those written for one microcomputer are unlikely to run on any other make of microcomputer (or, indeed, even on other models produced by the same manufacturer, though this varies).

In fact, the only guarantee of transportability of materials is to possess the make and model of machine for which a given set of CALL materials was programmed.

From the point of view purely of availability of off-the-shelf materials, it is clear that mainframes and minis have at the moment a decisive lead, though this is being quite quickly eroded, as many of these materials are being adapted to the most commonly used microcomputers, and microcomputer users are starting to produce their own materials, which are then often available to colleagues who have compatible hardware. Thus, an institution starting up in CALL would be wise, if it chooses a microcomputer system, to budget a sizeable amount of time and resources for the preparation of courseware.

Off-the shelf availability is not, however, the only angle on the courseware question. It is also important that the materials should be appro-

priate and well-designed. In particular, many people doubt whether boring drills in the behaviourist/structuralist style of language laboratory drills of 15–20 years ago will be made less boring by being presented «in glorious technicolor» on a computer screen, especially once the novelty has worn off. It should, however, be added that appropriately enhanced with student aids, etc., structural exercises are wholly suitable to computer presentation and do seem to achieve measurable improvements in students' knowledge of a language (e.g. the well-documented experiments carried out at Algonquin College, Ottawa – see *L'EAO au Département de Français du Collège Algonquin,* Robert VILLENEUVE, 1982).

It is clear that off-the-shelf CALL materials for microcomputers will improve in quantity and quality in the next few years, and the same probably applies for those produced for mainframes and minis.

If little is available ready-made, then the only possibility is to produce one's own courseware. This can be satisfying and should result in materials best suited to the students who will use them, but it can be very time-consuming and frustrating. Probably the safest method, though one that will probably take longer to produce the final product, is one where the teacher concentrates on materials design and hands his or her designs over to a professional programmer, who produces the programs, which are then tested, modified, re-tested and then made available for general use. This can involve much discussion and (until the programmer has gathered some experience of what is expected of him) explanation of the intention behind a given exercise, etc. The programmer may produce the materials in any standard programming language (thus increasing their transportability), or he may use an educational authoring language which has been specifically designed for educational applications. These languages have many powerful functions and, because they are simpler than general purpose languages, can more easily be learnt and used by teachers, who are thus made independent of programmers. For the moment, though, authoring languages are basically only available on mainframes and minis.

One might call the approach to materials production outlined above the «team» approach. It is also possible to combine both sides of the team in one person, as suggested in the reference to educational authoring languages. This should reduce considerably the time required for production of materials, and is not dependent on the use of an authoring language – any programming language can be used. In fact, what is probably the future path for CALL materials production is already visible, and it too puts the teacher in the place of the team, namely the use of

off-the-shelf routines (programs) which provide a variety of «templates» or pre-designed formats into which the teacher simply enters the material that constitutes the object of the lesson. Thus, a template enabling the production of cloze tests would problably invite the teacher to enter the text and would then prompt for information as to what words should be replaced by blanks; with this information, the template would then, when instructed, produce the actual program for the exercise that students would subsequently perform. This «programming without tears» is being developed and rendered more sophisticated in many centres of excellence, and it could well provide the standard means of producing CALL materials five or ten years hence, provided that the templates can be made more powerful and flexible without their complication for the user being increased over much. Even today, templates present the triple virtues of speed, reliability and cheapness, three factors which weigh heavily in the balance for any people. If they enable the production of effective courseware (even if it is unsophisticated in the eyes of the virtuosos of the computer keyboard) that holds the interests of students using it, then that is quite sufficient to justify their use.

The future

It is difficult to say what point CALL will have reached ten years from now, but it is possible to discern three trends among colleagues currently at the forefront of materials production. The first is a realisation that optimum individualisation of instruction is only attained if more control (active or passive) is passed to the student. Central to active control is the «quit» option, by which a student can stop doing a given exercise and return to the menu, with the alternative of either choosing a new exercise or stopping. Passive control manifests itself in such devices as computer evaluations of a student's performance which lead to the selection by the computer of more or less difficult variants of an exercise chosen by the student from the menu.

A second trend is towards more imaginative CALL materials to supplement (and perhaps eventually replace) the more routine structural exercises. Here, anything is imaginable, from the simple game of Hangman to very complex and sophisticated simulations such as might be used in teaching L1 rather than L2 or even in teaching the basics of a subject such as economics. Thus, there is an increasing attempt to put the language being taught into contexts where it is a tool (rather than an ability that is tested or developed in a direct, frontal approach).

A third trend that I perceive is towards the building up in the courseware of a network of aids for the student. These range from the possibility to ask the translation of a word, through the constant availability of a summary of the grammar point being taught/tested, to a refined system of evaluations of and comments on the student's imput. With this last formulation, I am alluding to sub-routines which distinguish quite successfully between typing mistakes and mistakes of substance, and which can, for example, tell the student that there is a mistake in the ending of the word that he has entered and can, if necessary, give him a brief explanation of the error.

On the hardware side, it is not too difficult to predict where we are going. We already have the touch-sensitive screen and the light-sensitive screen for incorporation in video units. With these, the student can touch or point a light pen at the right answer rather than enter anything on the keyboard. These will probably be used increasingly.

Looking only slightly into the future, it seems certain that a visual element will be linked with CALL programmes (indeed this has already been done experimentally, I believe) either through colour slides or the videodisc. The latter is admirably adapted to the purpose, since it can hold 55 000 frames which can be shown singly or as moving picture sequences and, more significantly, it can, unlike videotape, be accessed randomly. This latter feature makes possible in video the branching that is a feature of CALL programs. The audiodisc, which has already become a feature of everyday life, permits similar operations at the audio level and is, in its area, just as powerful as the videodisc (which, by the way, incorporates two high fidelity sound channels).

It is harder to see when speech synthesis will be incorporated into CALL programs, but it is doubtless only a question of time (the main impediment being the amount of memory space required). Until the time when much larger amounts of memory are available at affordable prices, though, speech synthesis can basically be ignored.

Several colleagues whom I consulted expressed the hope that language teachers working with CALL would not become obsessed with high technology as an end in itself. However beautiful, clever or advanced something may be, it should not be allowed to claim too much of our attention if something less beautiful, less clever and less advanced can perform perfectly adequately the same functions.

I have listed the main advantages of CALL (they are those of CAI in general) in my fourth paragraph, so I shall not repeat them here. Its advantages will doubtless increase as its range (especially video) increases.

On the debit side could be put:

a) the cost of the necessary hardware (variable)
b) the inevitable consumption of time and resources in the preparation of materials for this new medium.
c) the problems (currently, at least) with poor transportability of materials for microcomputers, unless one can borrow them from or exchange them with others who have the same microcomputer (basically Apple II, TI99/4A or, in the future, perhaps IBM PC).
d) the complication (currently, at least) of producing refined CALL materials, a factor which will discourage many.
e) doubts as to whether the current momentum can be maintained.

However, against this must be weighed the fact that many of the negative factors should decline in importance fairly rapidly. Moreover, it is difficult to see how the technologisation of education can be resisted (or in many instances, *why* it should be resisted), especially the intrusion of the computer into the learning process, bringing, as it does, considerable advantages for the student.

It has been argued (usually by those who have no computer experience and have never thought much about the question) that the introduction of CAI constitutes a dehumanisation of the learning process. The wrongness of this statement is soon evident if one remembers that, after all, it is a human mind that designed the lesson in the first place, and it is with that mind that the student interacts individually, even if the interaction be limited to certain planes. In the not-too-distant future, the quality of this interaction should also improve.

Given the motivating effect of computers and the way in which they provide a real step forward in individualisation of instruction, I think that all language teachers should seriously ask themselves whether they ought not to attempt to incorporate some CALL into their approach. Those for whom programming will always be a closed book can at least try the template system, and can reasonably expect to be able to buy off-the-shelf materials in an increasing variety. However, for those willing to tackle the art of programming, a stimulating new area of professional

activity will open up, and they will, at the same time, be offering their students something really different, enjoyable and useful[2].

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Bibliography

Those interested in reading a little about CALL could start with either of:

KENNING & KENNING: An Introduction to Computer-Assisted Language Teaching, OUP, 1983
HIGGINS & JOHNS: Computers in Language Learning, Collins, 1984

Also useful:
CILT Information Guide No. 22
CILT Specialised bibliography No. B 32

2 A seminar on CALL materials is planned at the language laboratories of the Hochschule St. Gallen, during which authors in the forefront of software production will present their programs, and a basic introduction to writing CALL software will be given. The date of the seminar is not yet fixed, but will probably be in the last week of september 1985.