1984

Computer-Assisted Language Learning: Issues, Perspectives and Practices

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COMPUTER-ASSISTED LANGUAGE LEARNING:

ISSUES, PERSPECTIVES AND PRACTICES

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Submitted in partial fulfillment of the requirements for the Master of Arts in Teaching degree at the School for International Training, Brattleboro, Vermont.

June 1984

This project by Evelyn Fella is accepted in its present form.

Date 7-25-84

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ABSTRACT

In an attempt to respond to concerns and misunderstandings on the part of teachers about the computer, this paper explores its use as a technological tool in the foreign language classroom. The role of the computer in a language classroom as well as its strengths and limitations are discussed. The paper presents a comprehensive description of state of the art courseware for language learners, guidelines for evaluating the courseware and suggestions for classroom use.

ERIC DESCRIPTORS

COMPUTER ASSISTED INSTRUCTION

EDUCATIONAL TECHNOLOGY

SECOND LANGUAGE INSTRUCTION

PROGRAMMED INSTRUCTIONAL MATERIALS

TEACHING METHODS

COMPUTER SIMULATION

ACKNOWLEDGEMENTS

I would like to gratefully acknowledge the generosity and assistance of the British Council in Munich and London, the Goethe Institute in Munich and Computer Source of Hilton Head Island, S.C.

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> Computers in my classroom? There must be some mistake here. I'm not the math teacher. I am the language teacher - the foreign language teacher. I know there are a lot of computers in schools but they're only for math classes or teaching computer literacy. I deal with language and people. I have always been a student of the Arts and the Humanities. None of that technical stuff for me. Machines are so cold and impersonal. My goal is to create a trusting and non-threatening environment in my classroom. The computer will have the students walking out before they even sit down. Besides, I don't do question and answer drills. That went out with ALM and the behaviourists of the sixties. I consider myself a humanistic teacher and the computer is about as far from a humanist as the North Pole is from the South Pole.

These comments, which could have come from any teacher of any liberal arts subject, clearly express the widespread unwillingness to accept computer technology. This unwillingness, coupled with teachers' misconceptions about the capabilities of computers were found to be the major problems facing the use of computers in schools in a study done by Educational Research Service in 1982. (cited by Harrison 1984)

In view of these attitudes, how, then, have the increasing numbers of computers managed to make their way into classrooms? Have profit-seeking high tech companies mesmerized education administrators to convince them that the computer is the answer to our nation's education problems? Is computer-assisted learning based on any pedagogically sound theories of learning or are those who are embracing it, doing so out of over-zealous respect

for the almighty Computer? Does the computer have any inherent qualities that distinguishes it from the technological tools of the past? What exactly is computer-assisted language learning anyway?

The intention of this paper is to help the reader answer these questions and judge the potential of computer-assisted language learning (CALL)[1] for himself. A review of some of the issues and major concerns of foreign language teachers will be followed by a discussion of the role of the computer and its strengths and limitations as a learning tool. Many misconceptions stem from a lack of knowledge of what CALL is, and for this reason we will turn our attention to the programs available for language learning in the second half of the paper. Learning to best make use of the full potential of these programs is a three-fold task. The most obvious aspect of this task is to become familiar with the range of software which has been developed for the language classroom. Next, guidelines for evaluating software will be presented and finally some suggestions

[1] Until recently, British writers have used the terms computer-assisted learning (CAL) and computer-assisted langauge learning (CALL), where U.S. writers have preferred computer-assister instruction (CAI) and computer-assisted language instruction (CALI). Today, the terms are interchangeable; there is no difference in meaning nor do they indicate the writer's nationality.

for classroom use. After becoming aware of what CALL is and the issues involved, the reader should be prepared to decide whether the computer is a tool which he would want to incorporate into his teaching.

So that the discussion of CALL and software can be read with a critical eye, let us first review some of the issues raised by language teachers and some of the assumptions about language learning which have given rise to these concerns. Looking at the strategies of good language learners will also help us define points to look for in an effective language learning tool.

Probably the most commonly voiced reason for reluctance towards the computer is the negative connotations of a machine - cold, impersonal, sometimes even dehumanizing; a machine which many perceive as threatening. The importance of a non-threatening environment to the learning process has become a generally accepted principle. Because of the inherent link between language and self-concept, language learners are very susceptible to feeling insecure and threatened by a new language. For this reason there has been much focus on the affective needs of the learner and providing a secure, personable atmosphere has become a major goal for many teachers. A computer, if perceived

as a cold, impersonal machine, could be a disturbing element.

A second issue in learning, and especially language learning, is the question of who directs the learning. T.F. Johns (1982) tells us that the most powerful myth of the computer is its all knowingness. Not only does this idea produce a feeling of intimidation but it leads to the assumption that the machine is in control of the human being. The standard model of interaction between the computer and student derives from the teacher-centered classroom, (Johns 1981) a model which many would like to see de-emphasized.

Humanistically-based classrooms are to be learner-centered and teachers favor sharing control with the students. These teachers encourage the students' movement towards independence by letting them take on responsibility and initiative for the direction and content of their learning. The amount of control a teacher may have is a disputed issue. Nevertheless, in any classroom in which the student takes on initiative for learning and uses student-generated material, a computer-directed as well as a teacher-directed lesson would be out of place.

A frequent complaint about the computer is that it can only be used for reading or writing skills. Language involves four skills and the recent rise of communucative

methods indicates that teachers and learners are increasingly interested in developing oral/aural fluency. Though voice synthesizers exist, the quality is not yet at a point which would be desirable for simulating human conversation for the purposes of language learning.

Related to this problem of the linguistic limitations is a feeling amongst some that CALL is nothing more than programmed learning under a new name. In order to make any distinctions or parallels, a definition is necessary. Earl Stevick (1980:114) tells us that programmed learning

> ...is based on the assumption that people (and animals in general) learn principally by doing things right and then being rewarded in some way for doing so. ... the learner meets one tightly structured bit of learning space (one "frame") after another, and is invited to assert himself into it in some very clearly defined way - perhaps by pushing one of four buttons...

This type of learning, based on Skinner's theory of stimulus-response, is also closely associated with the Audio-Lingual Method (ALM). The recognition of the existence of a variety of cognitive styles among learners however, has lead to a re-examination of the idea that learning can be equated with habit formation. Habit formation may indeed be one of these cognitive styles, but only one among many. Though these assumptions behind programmed learning and ALM have fallen out of favour with many language teachers, the type of drills,

substitution, transformation and repetition can probably still be found in the majority of language classrooms around the world.

Taking stock, we find that impersonal environment, machine-control, lack of four-skill practice, and confusion with programmed learning or habit formation are the major accusations against CALL. Before attempting to offer any answers to these concerns about the computer, let us first look at some strategies used by good language learners. By doing this we can determine what skills a good language training tool should help the langauge learner acquire.

In the article, "What Good Language Learners Can Teach Us," Rubin (1976) tells us that good language learners are good guessers. They understand part of the information and infer the rest using clues of the setting. Secondly, they have a strong desire to communicate and are willing to do many things including appearing foolish in order to do so. They are willing to make mistakes and accept a certain amount of vagueness and uncertainty. Playing with the language by forming new words and sentences and then checking the response is another tactic of a good language learner. All of these things assume a certain devil-may-care attitude or the feeling of having nothing to lose, a willingness to take risks. But Rubin tells us this learner is also prepared

to attend to form: to look for patterns, to analyze, categorize and synthesize as well as monitor his own speech and how it is received. After all, his motivation is communication, which involves both comprehension and expression.

Based on Rubin's research one can conclude that a good language learning tool should provide such strong motivation to communicate that the student would be willing to take risks, even appear foolish. It would encourage guessing, playfulness, and experimentation with the language. But it would also train the student to look for patterns and clues, to analyze, and categorize. These are points which can be used as guidelines in determining the usefulness of the computer as a language learning tool.

Now that we have reviewed some of the demands of present-day language teachers, as well as some strategies of good language learners, we are prepared to investigate CALL more closely. After examining the role of the computer and its strengths and limitations in a language classroom, the reader will be able to determine to what extent the concerns about using CALL are justified.

THE ROLE OF THE COMPUTER IN THE CLASSROOM

Fear that the computer will usurp their role in the classroom may explain the reluctance of some teachers to accept this new technology. We can best dispel any anxiety of this kind with an examination of the computer's function in the foreign language classroom.

Clearly, it has the capacity to emulate the teacher as tutor in its ability to prompt a response, check it, guide the student towards the correct answer, evaluate his answer, record it, and give explanations. However, the computer cannot fill the teacher's shoes in responding to the learner's affective needs which have come to be accepted as an important variable in the learning process. Though it can determine the student's linguistic problems through the percentage of right and wrong answers, it cannot take affective needs such as mood, health, emotions into account. It lacks the ability to know the student as a whole person, to understand his problems and needs and to react accordingly. It is, in effect, nothing more than a tool which the teacher uses as he sees fit in responding to the needs of the learner. Just as the name, computer-assisted language learning expresses, the computer's role is to <u>aid</u> the learning.

Up until now, however, CALL has been confused with programmed learning because of its extensive use in the role of tutor or perhaps more descriptively, drill sergeant. Seymour Papert (1980:36) believes that using the computer as an instrument for drill and practice has appealed to teachers because it resembles traditional teaching methods. A commonly held belief is that CALL should free the teacher from the mundane, mechanical side of language teaching. But what can be motivating, beneficial or innovative about programs which are designed to take on such a mundane, mechanical job?

By using the computer as a drill sergeant which puts the student through his paces, the full potential of CALL is being overlooked. I have often used the tip of a knife to tighten or loosen screws or to pierce potatoes before baking them. Had I, however, never used the long cutting edge of a knife, I would have never used it in its full capacity as a tool. This analogy can also be applied to CALL. Merely a small tip of the potential of CALL will be used if the only role we assign it is that of tutor.

John Higgins (1983a) suggests two models of a teacher; one which he calls **magister** and the other **pedagogue**. Teacher-directed classrooms can be defined as the teacher taking on the role of a **magister**, a schoolmaster or tutor who is all-knowing in his field

and therefore qualified to direct his students' learning which includes what they learn and how they will learn.

We see another model of teacher emerging in learner-centered classrooms. Higgins (1983a) calls this type of teacher a **pedagogue**, originally a Greek slave who escorted children to school. Modelling the computer's function after this figure gives us a role better suited to make the most of the potential of the computer as a teaching tool. Higgins (1983a:4) describes the **pedagogue's** position in a patrician family:

> When the young master snaps his fingers, he comes forward to give information, answer questions, or perhaps, if that is what the young master wants, to conduct an argument, or give a test. He may be an expert but his expertise only emerges on demand: he is a walking library.

By assigning the role of **pedagogue** to the computer, the student can make use of the computer's vast store of knowledge without relinquishing control over his learning. Rather than offering drill questions, the computer can offer a variety of activities which are highly interactive and potentially motivating to the learner. Thus the role of tutor is changed to that of an opponent in a game, or a problem solving tool, or a source of topics of conversation, or an entertaining correspondent, just to name a few of an infinite number of possibilities. The computer thereby becomes a

resource, providing new ways of increasing the learner's exposure to meaningful language. (Higgins 1983a)

Viewing the computer as a resource, rather than a threat is a necessary step for teachers who wish to take advantage of its many capabilites. We will now continue our examination of CALL by exploring the strengths and limitations of the computer in this capacity.

THE STRENGTHS AND LIMITATIONS OF CALL

The following sections will discuss the strengths and weaknesses of CALL at its present stage of development. The reader should be aware however, that the microcomputer industry is characterized by rapid changes. In the near future, advantages to using CALL could be added to the list as a result of technical advances, or technical limitations of the computer may be solved, eliminating some of the weaknesses that presently exist. This is in keeping with the one quality that runs through all points to be mentioned: flexibility, CALL's major attraction to a generation of teachers concerned with being able to adapt to their student's needs.

STRENGTHS

Interaction

In examining the ways in which CALL provides sources of meaningful language in the classroom, we find some inherent qualities which distinguish it from technological tools of the past. The key word for describing CALL's main attribute is interaction. The computer demands some input on the learner's part and immediately responds appropriately. Thus, as Davies (1981) points out, CALL can offer the student an

environment which is continuously altered by his own actions. Its ability to "make decisions" and to adapt its activity in response to input is unique among technological aids. Neither language lab nor video can offer the possibility of content which is affected by the student's response. Graham Davies (1981:5) describes the student's positive reaction to this possibility:

> students derive a good deal of security from the fact that the computer reacts to every response they make - which is not so in the language lab, where a student may plough through a dozen drills, get them all wrong and not be checked.

The type of response given on tapes can assume only one answer: the correct one. This cannot be considered communication. In attempting to simulate reality, one must allow for the unpredictable. For this reason, the computer also falls short of offering real communication as the responses are pre-programmed and lack the spontaneity of human communication. Nevertheless, the immediacy of the response, usually instantaneous, and its appropriateness to the student's entry is the closest a technological tool has ever come to simulated communication in the foreign language classroom.

An extension of the interaction between the student and the computer is the increased interaction that takes place among students. How this is initiated will become

clearer in the ensuing review of language learning programs. For now, the point suffices that when working with small groups with the computer, especially in the role of **pedagogue**, students are given the opportunity to work as a team or as competitors with a purpose. This condition affords the possibility for a great deal of functional language such as strategy planning, consultation, persuasion, bargaining, discussion, and so on. Even when using a tutorial program with students working one to a computer, I have experienced a great amount of shouting between the students to inform each other of their progress. As Higgins (1983b:9) confirms,

> There may be no sound on my machines, but introducing a computer has never in my experience diminished the amount of spoken language occurring in a classroom. In this sense at least, computers can be described as communicative.

Individualized instruction

Though the term communicative seems to have become an adjective which teachers in the field regard as a magic word to ensure results, traditional types of grammatical drill practice still play an important part in classroom lesson plans. It is especially this type of focused language learning which can benefit from the advantage of individualized instruction with maximum control on the learner's part. When working one-on-one with the computer, the student can choose to go on to

the next question or level when he is ready and not because someone else in the class is ready and eager. Nor must he be held back because others have not yet grasped the point. Each individual student can determine the level and pace of learning which is right for him. Even in game-type programs, whose goal is to train the student's ability to respond quickly, the student can control the amount of time allotted to give an answer.

In most tutorial programs, the student is given a choice in the level of the exercises. If he finds the exercise too easy or too difficult as he is doing it, he can always switch back to the menu, which is analogous to a table of contents, to change his choice. Especially in a language class where students are rarely at the same level, this type of flexibility is extremely important and has thus far been impossible with traditional types of worksheets or written handouts. Working with a computer offers the slow student the opportunity to repeat things which are still not fully clear to him while the faster student can make use of this time doing work beyond the course curriculum.

A further help to the learner is a technique called branching. If the learner is having trouble with a particular area, the computer can be programmed to give him more practice until the student has mastered it.

This practice can take the form of more exercise questions or a short grammatical review of the problem area. There are two possible formats for doing this. Any time the student gets more than a specified number wrong, the computer will automatically display a help lesson. Though this can be very beneficial, the student may feel locked into something he does not feel necessary. An alternative exists in many programs where the student may choose the help program if and when he feels he needs it.

Feedback

The term feedback, which originated in the field of technology, has found important application in present language learning classes. Although there is both a negative and positive side of feedback, the computer eliminates the negative while offering advantages not available with any other tool.

The major advantage offered to the student is the elimination of negative feedback. The discomfort of the non-verbal signs of others waiting, an eternity of pregnant silence accompanied by stiffled coughs and shuffling feet or the pain of hearing others laugh is something which everyone has felt at some time. This type of feedback is a given in any classroom situation;

certainly not what the teacher concerned with a non-threatening environment desires.

With the computer, a student may answer at his own pace, whenever he feels ready, but the non-verbal signs of others waiting or verbal signs of ridicule or judgment are eliminated. The computer affords the student privacy of communication and time (Nold 1981, cited by Lazine and Fechter 1981). The best confirmation of this comes from a children's newspaper article (Evans 1983) on the use of computers.

> A kid may not be as nervous with them as with a teacher because with a teacher, if a kid gives a bad answer, the teacher's opinion of him might not be very good or vice versa. With the computer, the kid doesn't have to worry about opinions. Certainly the computer is not going to say, 'Hey, this kid is no good.'

Davies (1981) has commented that the student is more prepared to stick his neck out, take risks and make guesses in an environment where he knows that his silliest mistakes are strictly between him and the machine. This paves the way for the kind of exploration, experimentation and playfulness that can lead the student to important discoveries about the language.

The other meaning of feedback is the response which the student receives informing him that his entry is correct or incorrect, giving him praise, encouragement,

or solace. The nature and quantity of the feedback which is desirable for the language learner is a point which is disputed in the field. Here again, the computer's flexibility can offer any type of feedback the teacher feels appropriate for the students.

Students have always been able to find a correct answer, be it through an answer key at the back of a book or a recorded voice repeating the correct answer. But the computer can go beyond this very simplistic method of merely declaring the answer right or wrong. Instead, it guides the student to the correct answer. It can give clues so that the student has a second or third chance at arriving at the correct answer himself, thus eliminating the right answer merely being given to him.

In an attempt to answer concerns about the impersonal, cold machine, efforts have been made to personlize feedback. In many programs, the student is asked his name at the beginning and it is then inserted with every response. Many students are delighted by feedback statements such as "John, you're a genius" or "Too bad Joe, you didn't get that one. But try another one." In some programs, the computer has a name and the dialogue between it and the student attempts to mirror human conversation with an introductory "chat" about the weather or how the computer or student is feeling.

Not all teachers desire this kind of anthropomorphism nor such phrases of exaggerated praise when the student answers correctly. This type of feedback is not an integral part of CALL, but feedback or a response to an entry is. Most programs available include rather effusive feedback, so that teachers not wishing this would have to possess some programming skills in order to eliminate it.

One limitation which exists in the area of feedback is seen in situations where the student gives a correct response that the computer does not recognize as an acceptable answer. Innovative designers however, have formulated responses such as, "That's not what I want. I want you to say..." in order to bypass the problem of calling a correct answer wrong. Having used those exact words many times myself when trying to drill a particular grammar point, it seems justifiable to allow the computer its preferences. As I have only read of a couple of programs which use this response however, this problem remains a common one.

The student is not the only one capable of receiving feedback when using the computer. A record of his performance can be kept on file so that the teacher is able to see what the student's problems are and then emphasize or review this area in class. Though this seems to be an invaluable aid to the teacher, students do

do not always react favorably to this "Big Brother" option. It re-introduces the possibility of teacher judgement and not all students feel comfortable with it. Teachers are therefore advised to implement this option with openness towards their students: inform them that a record is being kept and be open to their feelings and reactions about it.

Summing up, the feedback available to the student and the teacher clearly displays one of the most frequently praised features inherent to the computer: flexibility. The feedback which ranges from a running account of the student's performance for both the student and teacher, through clues and reviews, to the possibility of personal words of encouragement or comfort, as well as the elimination of negative feedback from the learning environment are features not easily matched by other language teaching aids.

Language context

The computer's role as a resource for meaningful language has already been mentioned; nevertheless the computer's chameleon-like ability to be any type of language context the user desires must also be included in a list of strengths of CALL. Most people know of its ability to ask the student questions and to test his knowledge but this is obviously only one method of

learning. As language is involved in any kind of interaction with the computer, the student can benefit through indirect language learning activities such as games and puzzles.

If the student is involved in playing a game with the computer, he is exposed to a language environment which requires a response. This response may stem from collaboration with team members or it may have been kindled by the desire to express threatening comments to his opponent, the computer. Learning the language is not the task at hand in a simulation; yet the student must use a great deal of language when taking part in one. Possibilities for verbal interaction and discussion of any number of topics, including the computer itself lead to indirect language learning which cannot be overlooked when evaluating CALL's ability in aiding the language learner.

Fascination

There is one last feature of CALL which I feel worthy of mention though there is danger that it may pass in time. At least at this point, there exists a certain fascination in working with the computer which has a beneficial effect on learner motivation. Higgins (1983b) describes it as "the element of commitment which arises when an individual or small group work with a computer." Kenning and Kenning (1983:3) also speak of "a kind of

fascination" the computer holds for many people. It is this fascination which provides the motivation so necessary for learning.

The novelty of the challenge of working with or against the computer seems to inspire many students to hours of time spent in trying to prove their superiority over the machine. It is this challenge that makes the dialogue between student and computer more meaningful. It becomes important to the student to beat the computer and he is more willing to look for tricks to do this. These tricks may take the form of looking for contextual clues or attempting to fool the computer by trying different answers which it may not know.

The fascination for the machine can quickly wear off however, with overexposure or the lack of challenging, innovative programs. As Thornton (1982) warns, courseware designers must "capitalise on the unique facilities offered by the computer so as to explore new kinds of lessons which would continue to motivate students even when CALL lessons have ceased to be a novelty and have become a regular slot in the student's timetable."

Another aspect of this fascination is the positive effect the computer has on attitudes towards writing. There have been no claims that writing has actually improved in the computer-assisted writing programs around

the nation. The only report of change has been in the students' attitude towards writing and re-drafting. Higgins (1982b:1) gives us a realistic view of what word processing programs can do for students:

> A word processor will not teach any composition skills by itself, but by providing the perfect surface for editing, it can in the hands of a sympathetic teacher encourage a new set of attitudes toward self-correction and re-drafting.

If the idea of student-controlled learning is held to be the most effective type of learning then self-correction and positive attitudes towards self-correction must also be essential to learning. Freer experimentation in writing is possible if the computer is allowed to free us from the rather mundane, laborious job of moving sentences and paragraghs around the page. Especially at the university or advanced level, this can be an important factor in second language learning.

In conclusion, the strengths of CALL include increased potential for interaction with the language, individualized instruction, feedback, and a fascination with the computer which can produce high levels of motivation. When examining CALL materials, these are the features which a teacher must bear in mind as necessary, if the program is to be an effective aid to the learner.

THE LIMITATIONS OF CALL

Breakdowns and Inexperience

Any teacher who has worked with any technical aid in the classroom knows that the greatest problem is quite simply the unreliability of machines. In many cases, the one time a teacher has planned her lesson around any technological tool which then proves to be out of order, is enough to discourage the teacher from ever again planning a machine into her curriculum. Though it seems to happen far less frequently than with language labs, computers can breakdown or just have technical "bugs" which can prevent the inexperienced teacher from continuing with her class. The obvious solution, which is admittedly of little comfort, is for the teacher to plan an alternative lesson, just in case. Just as the computer offers great flexibility, it in turn, requires a certain amount of flexibility on the user's part.

Many of the technical problems which might arise could be overcome by a minimal amount of knowledge about the computer by the teacher. Staff not adequately trained in using the computer was one of the major problems cited in the Educational Research Service Study. (1982, cited by Harrison 1984) Though some basic training in how to use the machine may seem obvious, it

is not unusual for teachers who have never touched a computer, to be expected to use one in their classrooms. Whether the reasons be administrative oversight or the teacher's own fear of the computer, it is this lack of training which jeopardizes the future of CALL more than anything else.

Speaking of a more sophisticated level of experience, if a teacher were to possess programming skills, the potential of adapting the programs to the needs of her students would be limitless. This is a pre-requisite to make optimal use of the computer, but a teacher need not know how to program in order to benefit from CALL or even consider using it. Quite to the contrary, this is one of the misconceptions about CALL which I would like to dispel.

Clearly, some training in the use of the computer is mandatory for effective use of CALL. The greater the programming skills, the more flexibility the teacher will possess. However, as long as teachers and administrators continue to ignore these prerequisites, computer-assisted learning will remain limited in its applications in the classroom. Contrary to popular belief, it is man who is in control of the machine, but he must know how to control it.

Screen

There are, of course, limitations involving physical discomfort. Probably the major complaint is the strain and restrictions of working with a screen. Looking at the screen can be very tiring on the eyes, especially when used over long periods of time. Even less than a printed page of text can be displayed at one time, and it is sometimes not as easy to flip through the pages as it would be with a book.

Keyboard

Another problem often brought up is the necessity of typing skills in order to use CALL. Critics claim that the keyboard impedes progress and distracts students from the linguistic task. Many programs attempt to bypass this by requiring only single-key strokes for an entry. But the question of how actively the student is using the language then arises. The computer would have no real advantage in offering active participation in the language, if single-key strokes were the only form of communication possible.

The inablilty of the computer to distinguish typing errors from linguistic errors is another problem which arises from the necessity of typing in responses. Some programs have a feature called partial matching. This will rewrite the correct portion of what the student has

entered and leave the incorrect words blank, asking the student to retype only the blanked-out parts. Another approach is for the computer to use arrows to point to the incorrect word to indicate there must be a change. This may be good training for accurate spelling, but it seems a tedious task which takes concentration away from other aspects of the language which may be of more importance to the student.

In spite of all attempts to bypass them, the screen and keyboard remain artificial and laborious modes of communication. Developments in technology will probably solve these problems in less time than one might expect. Touch screens in which the user responds by pointing to something on the screen and a hand-held pointer called a "mouse", already offer alternatives to the keyboard. Nevertheless, the keyboard will most likely remain the principle mode of communication for some time to come and it is a hurdle anyone wishing to use the computer must overcome.

Oral Communication

The inablility of the computer to provide for natural, oral communication is the limitation which prevents CALL from being an aid suited to activities for all four language skills. CALL's medium is most definitely written language. Though the promise of

voice recognition and voice synthesis has already been fulfilled, it is questionable whether the computer will ever be able to recognize the sometimes rather garbled phrases and sentences of the non-native speaker. As a result, these technical advances would have little effect in the field of second language learning.

The future holds much promise in regard to progress in oral/aural capabilities, but the situation as is calls for knowledge of what sort of activities the computer is suited for and clear objectives in the teacher's use of the computer in her lesson.

Software

So far, all the limitations mentioned have primarily concerned the hardware, meaning the machinery. The most serious limitation however, lies not with the technology, but with the quality of the software; the actual "text". The lack on the commercial market of innovative programs based on modern pedagogical assumptions is the single most limiting factor to the use of the computer in education.

This accusation seems puzzling when one considers how long computers have been present in educational institutions. But programmers of the large main frame computers at universities were not teachers of languages and they could not know about the needs of language learners when developing software.

The best known such program is a system of lessons called PLATO which has been used extensively at the University of Illinois for more than ten years. In his review of the lessons, Vance Stevens (1983:295) tells us "they are slightly dated products of tests, teaching methods and technology of the last decade and they have consequently made little use of the capabilities of the system which are now available."

Papert (1980:36) compares the path of computers in education to other technologies which have also taken this winding road to maturity.

> The first use of the new technology is quite naturally to do in a slightly different way what had been done before without it... A whole generation was needed for the new era of motion pictures to emerge as something quite different from a linear mix of theater plus photography. Most of what has been done up to now under the name of "educational technology" or "computers in education" is still at the stage of the linear mix of old instructional methods with new technologies.

Since the appearance of the microcomputer, more and more creative programs, which will be described in the next section, have been developed by teachers, university departments and private institutions. One serious problem is that this creative type of software is generally not available on the commercial market to the teacher at the local high school or community college. A second major problem is that most of the programs are system-specific, meaning that they cannot be used on a

different type of computer. Teachers from different schools with different computers cannot share and exchange any of their software.

In the hope to one day see programs which have been written for learners rather than programs written for the computer, educators interested in CALL are strongly urged to write courseware themselves. Unless there is some response from educators or unless software industries make an effort to study the real needs of learners, the potential of CALL will go unfulfilled.

The limitations discussed touch upon every aspect of CALL: the hardware, the software and the users. Based on the rapid progress of the last five years since the first microcomputer appeared, manufacturers will certainly offer more improvements in the hardware. But the quality of the software and the inexperience of the user are the two limitations which can and must be improved upon by educators.

Our theoretical look at CALL is now complete. The reader has been made aware of the conditions desired by language teachers for their classrooms and their concerns about CALL. We have found a place for the computer in the classroom as a resource for meaningful language and reviewed its strengths and limitations as a learning tool. We are now prepared to look at the actual computer programs available to the language learner.

CALL COURSEWARE

We shall now turn our focus to the actual use of the computer in the classroom. In order to take full advantage of the potential of CALL, the teacher must know what sort of programs exist, how to evaluate them and what to do with them in the classroom. Our first task is to become acquainted with some of the courseware which has been developed for the foreign langauge learner.

Some of the most creative and exciting programs which I have found were developed in Britain. Especially in the field of English as a Second Language, British educators have made exceptional progress. One of, if not the leader, is John Higgins of the British Council. Not only has he written numerous creative programs for the ESL student, but he has written many articles discussing the educational assumptions of CALL. He has thus given credence to CALL as a valuable educational tool rather than just the latest space-age, electronic gimmick to be dismissed by serious educators.

There are no official, accepted names of categories of programs as of yet and the division between these categories is often fuzzy. But in order to give some structure to the description of the available software, I will use terms which Higgins (1982b) has given to three major categories. The first group, which are the more

conventional, most well-known, are called the interactive programs. The standard model of interaction in these programs derives from a teacher-centered class. (Johns 1981) The computer is basically responsible for initiating exchanges, assessing the student's response and providing feedback. This group has two subdivisions; the tutorial and non-tutorial programs. The tutorial programs entail some sort of linear progression through a syllabus. These programs work best with closed grammatical systems like tense choices where there is no question about what is correct. (Higgins 1982b) Non-tutorial programs include games, simulations and adventures.

The second major category which Higgins (1982b) mentions is synthetic generation. These programs use some sort of in-built grammar to generate teaching material. There is an important role reversal when using these as the student becomes aware of his control of the machine.

The final division, analytic generation, are programs which offer text that has somehow been distorted or manipulated by the computer either through deletion or reordering. These programs have been designed to develop reading skills.

The rest of this section offers detailed description, with examples of programs in these categories. The reader is asked to bear in mind the role, the strengths and the limitations of the computer which have already been discussed while reading through these descriptions. Guidelines for evaluation of programs will follow and finally some suggestions for classroom use. The reader should then be well-prepared to make decisions about using the computer in his class.

TUTORIAL PROGRAMS

Programmed Learning

Programmed learning, the technique which is most often associated with compter-assisted instruction of any kind, is based on Skinner's behaviouristic model of learning which has now come to be regarded by many with skepticism. It basically involves a presentation of a subject in small sequences or frames. Each frame contains one new concept at the most and one question which requires an answer. The questions test whether the student has grasped the material. (Higgins 1981b) They are not meant to be trick questions, but they are designed to block progress until there is comprehension.

Though this technique is most often associated with teaching machines of the nineteen sixties, hence the association with computers, it has been used in various non-technological aids including books. An example is the so-called scrambled book which asks the reader to turn to different pages depending on whether he answers yes or no. If the answer is correct, the student is asked to turn to the next page to learn a new concept. If he answers incorrectly, he is asked to return to the specific page where the information is presented and then try the question again. This type of book is a form of programmed learning though few people realize it.

The computer is merely one conveyor of programmed learning techniques and not synonymous with them. It is true that the computer is an excellent mode of this technique as it can do away with heavy volumes of books and prevent the learner from peeking at the answers or going on before he has comprehended the point.

The following is an example of a conventional computer dialogue. The computer's role is in capital letters.

```
PLEASE TELL ME YOUR NAME
John
HELLO JOHN.  TODAY WE CAN DO EXERCISES ON THE
PLURALS, THE DATIVE OR THE PAST TENSE.
WHICH DO YOU WANT?
Past
YOU WANT PAST TENSE.  IS THAT RIGHT? Y/N
Y
JUST A MINUTE PLEASE.
LET'S START WITH REGULAR VERBS.
THE PAST TENSE OF A REGULAR VERB IS MADE BY
ADDING -T- TO THE PLAIN STEM AND THEN ADDING
THE ENDING FOR PERSON. HERE IS A SENTENCE.
PLEASE MAKE IT PAST.
ICH WOHNE IN LONDON.
Ich wohnt in London
NO, THAT'S NOT RIGHT. YOU FORGOT THE 1ST
PERSON ENDING.
PLEASE TRY AGAIN.
Ich wohne in London
NO, NOW YOU FORGOT THE T
THE CORRECT ANSWER IS:
ICH WOHNTE IN LONDON.
NOW TRY THIS ONE.
```

Though programmed learning may be controversial, it can be an effective means of learning. However, there are three conditions which must be fulfilled. (Higgins 1981b) The subject matter must be well-defined and

finite; the learner's motivation must be strong and thirdly, it must have an element of urgency and intensiveness. Clearly, language learning goes beyond these limits and it has partly been CALL'S strong identification with programmed learning which has constrained it to this limited range. If this were the only application of the computer, experimentation with CALL need not be continued.

The following sections on the tutorial categories are all similar, and at times interchangeable. They are techniques used in various methods, among them ALM and programmmed learning. The major difference, as I see it, is that the following types of programs assume prior classroom contact with the material. They are not meant to teach but to practice what has been presented. In programmed learning, the frame teaches one concept after another, tiny step by tiny step.

Drill and Practice

Drill and practice programs most often take the form of question and answer drills, usually with multiple choice questions focusing on a particular grammar point. These types of drills are very familiar to any language class. The advantage of the computer is that it can give the student a second try at his answer and the chance to

receive some clues or help if he wishes. There are many programs called authoring programs, which allow the teacher to enter all of the data so that the material in question can correlate with material from class and the text.

The computer chooses the questions randomly so that the student never receives them in the same sequence. With most programs, if the student does not get the correct answer after the second try, the question will come back on the screen at a later point.

Multiple choice questions have become standard because the computer can only deal with a set of predetermined answers. The range of exercise types has been expanded however, through advancements in technology and programming skills which allow for the recognition of similar answers.

Christopher Jones (1983) tells of a computer exercise of this type which gives the student practice in reporting offers.

> The student sees a screen of instructions and examples in this case telling him to report the offers he will see, using one of three forms: (i)He offered (me) something (ii) He offered to (do s.t.) (iii) He offered to let (me) (do s.t.)....
> He answers the questions as they come up by typing them into the keyboard....It should be mentioned here that a variety of answers might be possible for one question. For the offer "I've got some money if you're short", the computer can be programmed to accept any of the following:

He offered me some money
He offered to lend me some money
He offered to let me borrow some money
He offered to let me have some money
(Jones 1983)

Though there are still strict limitations on the student's response, it is one step away from the sometimes frustrating little sentence so commonly used: only one answer is correct.

In this case, as with any exercise which requires the student to type in the entire sentence, the computer can make use of a technique called partial matching which reprints the correct parts of the response, leaving blanks where the student has made mistakes. He is then asked to retype only those parts which are incorrect.

An example of this taken from a drill converting French present tense to imperfect:

a. computer displays - je recois
b. student types - je recevait
c. computer - NOT QUITE je re_evai_
d. student - je reçevais

Any type of exercise which has traditionally been considered drill and practice, such as filling in the blanks, conjugating verbs, translating, or substitution drills, can easily be put on a computer program. The computer enhances these drills through its entire range of feedback which the student receives immediately as well as through the advantages of individualized instruction already discussed. The exercises however,

remain drill and practice and teachers must not expect that the computer can, in any way, change the nature of these exercises.

Scored quizzes and tests

Any of the exercises from the drill and practice section can be perceived as a quiz or a test by adding the element of scoring. There is much discussion in the field as to whether all work done with computers is in fact just testing and not really teaching. This is true if testing is defined as feedback to the teacher and student about the student's comprehension of and ability to use the new material.

In looking at the normal classroom procedure, after a presentation, the teacher is constantly "testing" the students to see if they have grasped the point. The student tests himself during a practice session to see if he is able to apply what he has learned. This on-going feedback for both teacher and student can take the form of correct answers to questions raised by the teacher or the student actually using the language he has learned.

What does the computer offer that paper and pencil or the classroom could not take care of? Using the computer can help change the pejorative associations of the word quiz and test and help students realize that they are valuable learning aids. In the U.S., the words

quiz and test effectively have the same meaning, though the test usually carries more weight in the student's grade. Who cannot remember that sinking feeling when the teacher announced a quiz? In British English however, (Higgins 1981a) quizzes are associated with competition and recreation rather than formal learning; they are casual and fun. This is really only a matter of terms, as we do see such things in Spelling Bees and other activities which are more likely to be perceived as games in this country, but whose goal is most definitely to test the student's knowledge in a specific area. The computer can be used as a bridge between game-like testing activites and the much feared quiz which gives the teacher scores for his grade book.

There are other, more concrete advantages for the student when using a computer. The most significant is the instant feedback on his score which he receives along with some sort of usually humourous comment as to his performance. In one program, this may range from "Your're a genius" to "Are you sure you're awake today?" There are, as always, the possible second chances and hints and clues which the computer gives, but naturally with a loss of points. The possibility of setting time limits is a feature which gives the student the cnance to pace himself. In this way, there is always a new challenge in trying to do the same quiz more quickly the

next time. Finally, the visual enhancements possible with graphics and animation cannot be overlooked. Besides their entertaining attraction, they offer a non-verbal mode of testing.

One example of a program of quizzes is WORDPACK by Chris Jones. (See Appendix 1) There are four different WORDPACKS available, each containing two language programs in which the teacher can insert the data, an important option in any program. The programs include multiple choice tests and general questions tests as well as tests of vocabulary through crossword puzzles and anagrams. One interesting program is called Matchit. Here the teacher is allowed to enter up to 15 pairs of items, translation, synonyms, opposites, and so on, for the student to match. These pairs are printed in two columns which grow shorter as correct answers are extracted and printed at the top of the screen. There is no scoring in this particular program but there is a time limit. These WORDPACK programs offer the language classroom a variety of activities with which students may quiz themselves on class material, thereby getting important feedback about their knowledge, in a non-threatening manner.

Testing

A major application of CALL is in testing. For teachers who are interested in this, there are authoring programs available which enable the teacher to create her own multiple-choice, true, false or fill-in-the-blank tests. There are two advantages to doing this with a computer rather than on paper. The first is that the questions can be programmed to appear in random order, thus deterring cheating if that is a problem. The second is that the computer can correct and score the test and give the teacher information about the results. Individual teachers must decide if these points along with the amount of classtime working with the computer justify it as a testing mode.

In summary, the most significant advantage of the use of computers for scored quizzes and tests is that the student can receive immediate feedback on his progress in class without causing the threat that the traditional classroom quizzes sometimes present. He can thereby learn to appreciate a quiz or test as a valuable learning aid. If a teacher decides to use the computer as a testing mode, he must, as always, be clear about what is being tested and if the use of the computer as a learning tool in class supports its use as a testing mode.

Having looked at all of the programs generally termed tutorial, there remains one type of program, data base management, which does not directly teach but could become a vital reference source for language learners. Thinking of Higgins' definition of the computer's role as **pedagogue**, one whose "expertise emerges only on demand," (Higgins 1983a) these programs seemed to have been designed to provide the expertise.

Data base management

This common application refers to a capability of the computer to store large amounts of information in files. The user can easily retrieve this information or parts of it as he needs it. It is therefore possible to put entire dictionaries on a program, or files of verb conjugations or prepositions and the like.

Though this may at first appear to be one more list, no different from paper lists, there is one vital difference which could change student's attitudes on correction: the ease and speed with which one can retrieve the information. I, like many of my students can be very lazy when it comes to leafing through a large dictionary to look up words or tedious verb lists to check my verb conjugations. With the computer, one merely chooses the type of information needed, - gender, irregular verbs, nouns, or adjectives, and then types in the word in question. Within seconds the information is displayed on

the screen. Students might be more motivated to edit and correct their writing if this easy option existed either in or outside of class.

There are also spelling check programs available. The user inserts his document and the spelling program checks all the words against its own dictionary of words. It checks spelling but it cannot check for grammaticality which is a major drawback for the second language learner. The words to, two, too are all acceptable words in the dictionary but the program cannot check their use. It would therefore accept the sentence, I have to dogs. For this reason it seems that such a program would be of greater benefit to the advanced student.

Hand-held, pocket-sized electronic dictionaries have already been put on the market: the first sign of computerized books. However, whether they will actually replace paper references is still an open question. If and when this occurs, it will revolutionize the way we retrieve and process information, thus creating new resources for the language learner and teacher.

This concludes the section on tutorial programs, designed to give students practice in specific areas of the language. The following section will cover non-tutorial programs which incorporate theoriess of indirect learning. They provide practice in the language though the student's attention is focused somewhere else.

NON-TUTORIAL PROGRAMS

GAMES

Because games contain inherent elements which provide a good framework for language learning, game-like features can be found in all three of the major categories of programs, interactive, synthetic and analytic.

Games always have a goal (Stevick 1982:128) and the players possess the same skill or ability which enables them to pursue this goal as a team or as competitors. In the case of language learning games, the common skill is the linguistic ability of the players. While playing, the learner's attention is focused on the goal, which could be related to his linguistic performance, but need not be as he is using his linguistic ability in pursuing the goal. Quite often the goal is only to be better than the competitor, in order to win the game.

Games have rules (Stevick 1982:129) and by accepting them, players agree to restrict their actions in certain ways. Accepting grammatical rules thus becomes a natural restriction within the context of a game. Though limits exist, actions are not entirely predictable and the player must use his skill to intervene with precision and timing; two more important factors in language.

Finally, with practice the learner has the chance to improve his performance.

Motivation, developing and improving skills, awareness of limits, timing and practice are all essential to good language learning. With games, teachers are using a vehicle for practicing all of the above. By using computer games, some of the enthusiasm and committment with which people play arcade-type games might be transferred to the classroom and added to the other essential elements.

Computer games can become quite addictive in one's attempt to beat the machine, perhaps out of some need to prove one's superiority over it. The satisfaction of winning produces enthusiasm and high motivation, but at the same time the skills which the games develop, either directly or indirectly, must correlate with the needs of the student. In order to make the use of computer games an effective learning aid, teachers must determine whether they truly develop skills essential to the student's needs and objectives.

Playing computer games just because the students enjoy them is forgetting the intention of using the computer as a learning aid. Teachers are asked to keep this in mind when evaluating all types of software, but especially where there is a danger of being charmed by a game and forgetting its linguistic objectives.

Probably the most well-known computer game available in most foreign languages is HANGMAN. There are several versions of this game but in most cases the computer "thinks" of a word or a sentence and displays only a blank line for each letter in the word or words in the sentence, along with the gallows on the graphic screen. The student guesses letters in the hope of guessing the word or sentence before he gets hanged.

With this type of game students start developing important strategies in order to avoid their execution by the computer. Though the first few letters guessed may be wild guesses, once a few correct letters have been discovered, the players must develop the ability to recognize permissible sequences of sounds. In a high school Spanish class, one boy explained how his trick was to guess an L first. By seeing the position of the L, he could determine whether the word was feminine or masculine, which then not only told him which vowel to use in the article but sometimes helped him with the last letter of the word. Little did he realize that he was developing an important skill in making use of the redundancy of language. Through this type of game, the learner is also accustoming himself to the acceptability of guessing, a strategy used by good language learners. (Rubin 1976)

Another game which makes wonderful use of graphics was developed at the Goethe Institute in Munich by Hannis Schumann. It is modeled on the violent type of Space Invaders game, but with an interesting twist. Our hero is an angel who appears on the screen with a bow and arrow. The sky is filled with drifting clouds which contain various topics such as professions, food, geography, or animals. The student can use the arrow keys on the keyboard or a joystick to move the angel in order to shoot his arrow into the category he would like to work with.

The screen is blanked out and the angel reappears with an umbrella in one hand and a beer mug in the other. Anyone who has ever spent time in Germany will appreciate the cultural connotations. A cloud with a word from the chosen category appears and the student must type in the appropriate gender. If the answer is correct, the definite article appears with the word and the cloud breaks into the beer mug. If the student is not correct, the cloud will burst into a shower over the angel, as the next cloud with its word hovers above. With too many mistakes, the puddle of water formed by these showers will grow into a sea, drowning the angel, while a devil, smiling smugly strolls across the surface of the water. At this point the student is shown all of the words with their correct definite articles. As I was drowned in my

mistakes, I can only assume that if the angel fills up his beer mug, he finds a sunny beer garden to sit in while reviewing the words with their articles.

This games offers several advantages besides the obvious review of articles. First, it is timed and the student must make very fast decisons. This gives him practice in responding quickly and relying on instinct which is important in learning to use German articles. Secondly, it can be played by more than one player which adds an important opportunity for interaction. Students can work in teams or compete against each other. The element of competition has always been a magic wand for making a great deal of vocal interest and enthusiasm appear in the quietest of classes.

The use of games is certainly nothing new to the language classroom, but the computer can enhance this technique to make it, when used properly, an even more effective tool for indirect language learning.

SIMULATIONS AND ADVENTURES

Simulation, in effect, role play, is another technique not unfamiliar to the language classroom. It provides the student with the experience of a certain role; making decisions and interacting with others in that role while pursuing a predetermined goal. The focus here is on the role and the goal, but the interaction necessary to attain the goal requires a great deal of language. Simulations basically provide students with a context for using language. (Higgins 1981a)

The goal can be anything from finding a treasure or detecting a murderer, to making a profit in a multinational company or saving an entire country from starvation. There is always some initial information given and a variety of possible paths which lead to the goal. Each decision the student makes has consequences. There are however, no right or wrong answers, merely answers resulting in a different twist in the path. Because of its powerful branching capability, the computer is an ideal medium for such simulations.

Some computer simulations have a specific educational goal like those written for ESL learners. One example is MURDER by John Higgins, which was designed for lower intermediate students practicing past tenses.

> Learners are summoned on the screen to a house in which a murder has been committed. They can look at a plan of the house, consult a list of suspects, question a suspect by typing in the questions 'Where were you? and Who was with you? and once they have detected a lie, accuse a suspect. If they are right the suspect will confess. (Higgins 1982c)

The program uses the randomising capacity of the computer so the game is different each time it is run. Though solving a mystery may seem like a game and a lot of fun to a student, there is some repetitive linguistic work involved, not always apparent to him. As Higgins (1982c) points out,

> In the ten minutes or so that learners spend solving a logic problem, they will have done quite a lot of reading of sentences containing past tenses and will have typed in ten or twelve questions, virtually a concealed repetition drill.

Higgins (1982c) is working on another program called CLOTHING STORE. In this program, the learners will simulate the role of sales personnel trying to earn commission on sales, but must avoid selling to customers who have exceeded their credit limit. This program is designed to give the learner painless practice in the functional language of requesting, offering, and refusing.

These simulations and others have been designed expressly for practicing specific functions of language. In this respect, they can be seen as a branch of drill and practice exercises. But true simulations are not so

narrow and the teacher's objective in using them is to to encourage language of any kind, as opposed to specific functions. They prove to be most beneficial when the task is completed in pairs or groups working in cooperation or in competition which provides a context for argument, discussion, consultation, and decision making. This leads to the students reaching a consensus and entering it in the computer. The immediate feedback received, offers a new springboard for more interaction.

Some simulations, which have been written for college business courses, can be used just as effectively for the second language learner. The most well-known computer simulation of this kind is HAMMURABI. The student takes on the role of the ruler of an ancient kingdom and has to save his population from starvation by planting and distributing the right amount of wheat. He must save himself from rebellion by hiring an army while coping with droughts, floods and other disasters. Other business simulations place the student at the head of small companies where he must try to make a profit while coping with various hardships. These do not entail as much reading but information in graphs and other financial data sheets provide a realistic basis for discussions, not untypical in the business world.

The main objective of simulations in a language classroom is interaction. As the interaction of the

students stems from the subject matter, its relevance to the students is of prime importance for the success of the language exercise. A teacher must choose the simulation wisely with much thought given to the amount of interest and investment the students will have in the subject.

I once observed a British Council class in Germany in which the students, high school teachers of English, were given the program BLEEPER, which is a business simulation. After only a few minutes, these students got up from the terminal, listing all the business people they knew who would be fascinated by the program but commenting that it was "nothing for English teachers".

One last form of computer simulation is called Adventure. These games, which often make wonderful use of graphics, create a fantasy world in which the player has to overcome a number of obstacles, wicked ogres in dungeons and dragons and the like, to reach his goal which is usually something like finding a treasure or rescuing a princess. The player types in simple commands like "go north", or "climb the wall", and the computer responds appropriately and presents a new scene.

Probably the major drawback of such adventure games is that the programs only recognize a limited set of commands. The student is thus restrained in his use of the language. Nevertheless, the computer understands

many syntactically complex commands like "take everything on the table except the keys". Moreover, it can offer some surprisingly appropriate responses.

When comparing with other types of programs, simulations and adventure games probably make the best use of the computer's interactive powers. They provide subject matter which will result in either interaction with other students or with the computer itself, in a fairly close approximation to human communication. This interaction, plus the amount of reading practice and the visual feature of graphics that these games offer, make them highly worthwhile language learning activities.

The review of interactive programs is now complete. The objective of classic programmed learning courseware is to teach new material to the student. Though many exist for mainframe computers, the teacher looking for programs for a microcomputer will have a difficult time finding one which can be considered purely programmed learning. Tutorial programs which aim to practice the language, but assume prior contact with the material are more common. There are numerous programs available in this section ranging from drill and practice exercises which offer immediate feedback to scored quizzes and tests. Non-tutorial programs include games and simulations. They offer possibilities for indirect

learning through activities which give the student practice in the language while his attention is focused on other goals.

We will now move on to the second major category: synthetic generation. These programs, which are limited in number at this time, offer an exciting alternative for the use of the computer in language learning.

SYNTHETIC GENERATION PROGRAMS

This second category of programs uses some form of inbuilt grammar which enables it to construct teaching material. (Higgins 1982b) Two forms of synthetic generation programs exist: uncontrolled and controlled generation. In neither does the computer play the traditional role of tutor, quizzing the learner on his knowledge; instead, the user takes on the leading role in these programs.

With uncontrolled generation the computer is allowed to create text by randomly choosing words with no regard to meaning from its lists of parts of speech. The vocabulary which the student enters is put into appropriately designated slots and the computer generates a story or poetry.

An example of this is a program called STORYMASTER. (See appendix 1) The program asks the student to enter any noun; then it asks for a verb and perhaps another noun. This continues until it has about six different words. A well-known nursery rhyme then appears with the student's entries substituting some of the nouns, verbs, adjectives of the rhyme. Though the result is usually nonsensical, the analysis of the process in a class discussion can serve a valuable purpose in language learning.

Papert (1980:48) tells of a 13-year-old girl who proclaimed that she finally understood "why we have nouns and verbs" after she had 'taught' her computer to generate poetry. In order to "teach" her computer to make strings of words that would look like English, she had to first classify words into categories and then "teach" the computer to choose words of an appropriate class. By doing this, the girl learned more than definitions for parts of speech. As Papert (1980:50) tells us, "she understood the general idea that words (like things) can be placed in different groups or sets, and that doing so could work for her." The work which this girl was doing involved the actual programming of an uncontrolled synthetic generation program. Though writing the program would result in optimal learning, working with finished uncontrolled generation software such as STORYMASTER can, with the aid of discussion and group analysis produce similar results.

As the name might imply, controlled generation programs have control over what is generated so that the results are not nonsensical. The computer does not really generate anything, but merely adds and/or uses what the learner has entered to match with its preprogrammed "knowledge".

The well-known game, ANIMALS, is an example of such a program in which the student teaches the computer

through a guessing game. The student must think of an animal and the computer tries to guess it. At the beginning, the computer only knows one animal and one question. After it has asked, DOES IT FLY? and guessed EAGLE, it gives up and asks the student to tell it the animal he was thinking of. The student then types in his animal, "camel" for example. Next, the computer requests that the student give a clue which will distinguish a camel from an eagle. The student then types a question: "Does it have a hump?" The computer now knows two animals and two questions. Armed with this new knowledge, it challenges the student to another game, only to lose again. But another animal with the clue to distinguish it from the last animal and its font of knowledge increases along with its chances of guessing correctly.

Though the student is "teaching" in this game, there are a couple of important lessons which he learns as well. The obvious valuable linguistic practice in asking questions and using vocabulary in a meaningful way is coupled with an important realization on the student's part that he is in control of the machine.

This brings us to some assumptions of such programs which are very different from conventional programs. As we have already seen, the relationship of the computer and student is now reversed. The student's role is an

active one as he controls the machine by "teaching" it or giving it the information it needs to create text. Logically, there is no scoring as the computer is the one who is "learning". These assumptions are essential for those exploring new ways of implementing the computer in education because they put the computer in a role which is more in keeping with present day teaching theories.

Exploratory programs

T. Johns is one educator who has explored new ways of using the computer. He has expanded the idea of the student as teacher to student as quizmaster. In his programs, which he has named exploratory, (Johns 1982) the student explores and tests the computer's inbuilt grammar, judging whether it is right or wrong. Through this process, the student is able to find the limitations of the computer's knowledge, thus establishing the linguistic rules involved.

Johns (1981) developed his first program of this kind on a Sinclair which is the smallest of computers, capitalizing on its toy-like appearance to stimulate interest in how much such a tiny toy could know. The students are challenged to find out, within a time limit set by the teacher, what the computer can and cannot do. This program, merely referred to as S-ENDING, (Higgins 1982a) offers to add an 's' to any English word either

real or invented in order to form the third person of a verb or the plural of a noun.

Such words as CAT-CATS, HOUSE-HOUSES are certainly no problem. In order to produce a miss, the students may try some irregular plurals CHILD-CHILDS or KNIFE-KNIFES (someone may realize this is also a verb however) or uncountable nouns, INFORMATION-INFORMATIONS. All of this is an experiential springboard for the discussion of the rules of pluralization.

Johns' second program (Johns 1981) is an offer by the computer to make a choice between 'a' and 'an' before a noun phrase. The program is sophisticated enough to distinguish between minimal pairs such as 'a uniformed person' and 'an uninformed person' so that it could be very challenging for the students to force it to make a mistake.

It is from the on-going and/or subsequent analysis and discussion of the program which the student derives the most benefit. In response to comments that learning a language involves more than mastery of inflectional morphology, Johns (1982) reminds us that the materials are process-oriented. The materials are "as much about the process of learning the target language through thinking about it as they are about s-endings or forms of the indifinite article."

A program which enables the student to explore a semantic element is one called LOAN. Here, the student inputs a sum of money and a relationship: brother, uncle, employee or stranger. The machine will generate a request for a loan of this sum. The student must discover how large a sum of money will trigger a switch to a more formal style of request for each relationship.

One reservation that Johns (1982) himself voices about exploratory programs is the demands they make upon the learner. They require "an alert and intelligent attitude to the task of learning." This is a requirement which must be met for any direct learning to ever take place. As the learner takes an active role with exploratory programs, there is less chance of any learning taking place without this positive attitude toward the task. Johns (1982) therefore warns that slow learners may be confused by such progams if the programs are not carefully integrated into an overall course of study.

The aim of exploratory programs Johns (1982) tells us, is "to develop strategies for use inside and outside the classroom for the exploration and puzzling out of the target language and its underlying irregularities." The idea of developing strategies rather than habits is an exciting alternative which CALL can help educators

attain, if the straitjacket of assumptions about the role of the computer in education is broken.

Developing strategies which result in better reading skills is also of importance to the second language learner. Programs which help the student do this are called analytic generation, the topic of the next section.

ANALYTIC GENERATION

Because the computer communicates in a written mode, its use in developing reading skills must logically be its most powerful application. Naturally written text does not necessitate a computer; paper and pencil have successfully served this purpose very well for centuries. But at the risk of being redundant, here again the computer offers the flexibility which any foreign language class, in catering to the needs of individual students, demands.

The programs in this category offer text which has been developed through analytic generation. This refers to a method which depends on the interaction between files of text and an operation performed on them. The computer can store text of various levels of difficulty, length and subject matter. The student chooses one and the computer can perform one of four operations, deletion, reordering, insertion or substitution, before displaying the text on the screen. So far the programs which have been developed have used only deletion and reordering. The student's task is to restore the text to its original form.

An awareness of some assumptions behind these programs will help the reader appreciate their value in aiding reading skills. The computer's role, here, is that of a tool to help develop reading skills. It is not

meant to act as a reader for several good reasons already mentioned, but the major being eye strain which will result after prolonged, concentrated reading on the computer screen.

In trying to develop better reading skills, it has been pointed out (Higgins 1983c) that convincing a reader to be more adventurous, to guess, to predict and to speculate, is likely to result in more effective reading. The computer offers its always anonymous, non-threatening, and game-like character to serve the purpose of encouraging adventurousness in the student. A second objective may be to increase speed in reading. One method of developing this skill (Higgins 1983c) is to flash texts up for impossibly short lengths of time in order to convince the student that some information still gets through. The flashcard technique has long been used in first language training and the use of the computer as an electronic flashcard can serve this purpose as well for second language learning.

Let us now look at the programs to see how the computer is used to aid in developing these skills.

Scrambling sentences and paragraphs are familiar exercises to foreign language classes and an easy task for the computer. One of the most interesting programs which offers this activity is JUMBLER (see appendix) by T.Johns, a compendium of three gambling games involving

text reordering. Johns (1981) points out that the only restrictions on the texts themselves is that they shouldn't be longer than the screen can display. Otherwise they may be constucted on any priniciple the teacher or student wishes, in any subject matter and linguistic level. In JUMBLEWORD, a word, maximum and minimum length determined by the student's running score, is randomly chosen, from a randomly chosen text, withdrawn, scrambled, and replaced. The student is offered odds based on the length of the jumbled word. He must find it and type it in correctly, using context to help in finding the correct answer. JUMBLECHUNK is the same, but a phrase or sentence is withdrawn and the words are scrambled. JUMBLEPARAGRAPH reorders the sentences of the text offering odds which depend on the number of sentences in the paragraph.

All three of these games and especially the last require a good deal of typing, and very accurate typing at that. However, with the possibility already available in word processing programs, of moving letters, words, or entire sentences by simply using arrow keys, the necessity of accurate typing skills will no longer be a restriction in such exercises.

The fact that the scrambled word or phrase is placed back in the passage makes this particular program a more meaningful exercise than other programs which just offer

to scramble a word or sentence out of context. In JUMBLER, the student is encouraged to use contextual clues when restoring order, an important reading skill.

Deletion, familiar in cloze exercises, is another operation which the computer is able to perform. The advantage here is the possibility of storing a whole range of texts which the student may call up according to his interest. He then directs the computer to delete the nth word, thus allowing him a choice in the level of difficulty. While doing the exercise, he can get a second chance at the answer, in addition to asking for clues such as the first or last letter of the word.

An extreme application of cloze is to delete the entire text which is what is done in Higgins' STORYBOARD. The student is given a choice of about four or five titles and then offered a look at the entire text he chooses. The passage is shown for a brief time, possibly 30 seconds, before it disappears. What reappears on the screen is a series of dashes which have replaced every letter of every word. Students guess words, usually starting with those in the title or words remembered from the brief display of the text, or just trying some of the most common words like articles or prepositions. Any correct guess puts the word back in place of the dashes everywhere it appears in the text. As the student pieces the text together, it begins to look like a cloze

exercise, and he can use contextual clues to help him find more words. If the student gets stuck, he can press a help key and the computer will fill in the next word. If he is having great difficulty, he can even ask to see the text once more.

In this one computer activity, the student is getting practice in several important reading skills; quickly skimming a text for key words, making guesses, and using contextual and syntactical clues to make predictions about the text. Besides this, help is only one key stroke away so he is never left feeling hopelessly lost.

A similar program is T. Johns' MASKER. (Higgins 1982b) The student is also presented with a blanked out text, a simple comprehension question and a sum of money with which he can "buy" bits of the text. He is offered, at different prices, the first word of each sentence, the five longest words in the passage, all the words of three letters or less, a specific word that he points to or a specific sentence. His task is to buy enough of the text to answer the question without overspending. Finding out which parts of a text usually have the highest information content (Higgins 1982b) is the important lesson the student learns while playing this game.

Another interesting program, CLOSEUP, by John Higgins, was being used in a class I observed last fall.

In order to give the students more practice in prediction, Higgins (1983c) invites the students to speculate about small amounts of information. The student is given 200 points to begin with and chooses a target score of up to 5000. Eight text titles appear on the screen, one of which has been 'chosen' by the computer. One word is randomly selected from the chosen text and displayed. The student's task is to find which passage the computer has chosen. By pressing M the student will receive more words from the text; the word in front and after the original word. If he thinks he knows what title the line is from, he may press G and guess. The player loses 10 points each time he asks for more words and one third of his stock of points for an incorrect guess. When the student guesses the correct title, the entire text is printed out.

By penalizing for wild guessing and for excessive caution when asking for more help than needed, Higgins (1983c:9) hopes to give students practice in assessing risk in this harmless environment of the classroom.

> In Close-up, the principle is limited to demonstrating that help must be paid for and diminishes potential rewards. The student must work out the strategy which secures the highest reward, balancing the cost of the help against the risk of doing without it.

So too, in trying to communicate in a foreign language, students must constantly weigh the risks

involved. Saying something one is uncertain of is a risk which could result in embarrassment or misunderstanding. It can, on the other hand, bring the rewards of communication with others. Hesitating, looking for help in books, or relying on others to do the talking can delay communication or perhaps even block it completely. There are nevertheless times when these things are necessary for any sort of communication to take place at all. Students must learn to weigh the risks against the rewards; it is practice in this type of strategy development which CLOSE-UP offers.

In the class I observed, this was, by far, the most popular activity with the students. They played in groups of twos and threes and became very involved in discussions when speculating about the possibilities. Though it seemed a good way to learn a lot of new vocabulary, the immediate motivation with the students remained their score. Their teacher was confident however that the students learned a lot more than they realized.

One last similar program which asks the student to piece a text together, without any typing, is DISCLOSE. This particular program is available with texts in English, French, and Spanish. The texts were very literary and appropriate only for very advanced students,

but the idea was a good one and definitely has great potential for lower level students, with different texts.

A short passage appears on the screen giving the player a moment to skim it before it disappears. A column of six to eight words then appears at the bottom of the screen with an arrow (→) which can be moved to point at any of the words by using the vertical arrow keys on the keyboard. Choosing the first word in the passage is easy as only one of the words is capitalized. A score is given for correct answers, depending on whether they are found on the first try or not. The players continue to piece the text together from the selection of words, using syntactical, contextual or intuitive clues.

There are two especially nice features in this game. First, typing is not a problem and second, the student's choice of words is limited to eight. For a student who draws a blank when he sees empty spaces, this could be more appealing than other programs which blanked out the entire text.

The reader should now have a good idea of the potential of using the computer for reading skills development. All of the programs discussed are most effective in concentrating the student's attention to the form, meaning and cohesion of text and developing the crucial skill of successful guessing. This area has the

potential of becoming one of the computer's most powerful applications in language learning.

In conclusion, I have presented the entire section on courseware description to make the reader aware of the broad range of possible computer applications in language learning. If educators continue to view CALL only in its narrowest application as a programmed learning teaching machine, the vast potential of the computer will be wasted. It is my hope that the knowledge of other possibilities will inspire educators to search for new means of using the computer. Only through the efforts of creative educators will the number of innovative applications increase and counterbalance the abundance of applications, whose pedagogical origins stem from theories of the past.

EVALUATION

The need for courseware to accompany the large amount of hardware which is literally being given to schools has been recognized as a lucrative market by numerous companies, including publishing houses. However, the mere recognition of the market is by no means a guarantee of the quality of the products. The lack of quality software, as has already been pointed out, is in fact, a major drawback to CALL. There is most definitely usable software available and a teacher wishing to use computers in the classroom must be capable of evaluating it for its strong and weak points.

The first obvious step is to decide on one's assumptions about learning in order to determine what kinds of courseware support them. For example, one basic question is that of control in the classroom. A teacher must be clear about how much control he feels a student must have. There are many educators who feel it is best to use the computer as part of a carefully managed programmed learning scheme. (Stevens 1983) These beliefs have resulted in a great deal of courseware which supports this assumption. Teachers who share this opinion should not have much trouble finding acceptable material when evaluating CALL courseware.

Other teachers are of the opinion that there are greater benefits when the learner has the freedom to

explore the medium as he wishes. They must look for programs which break from the linear progression of traditional modes of instruction and offer the student more control and freedom to follow his instincts. (Stevens, 1983) These teachers must be aware of what aspects of the software give the student more freedom and control.

In determining the criteria for adequate CALL programs, Stevens (1983) points out that the courseware should emphasize the inherent advantages of the computer over other instructional media. At this time, the novelty of the computer may be the major contributing factor to its motivational power. Once this novelty wears off, the courseware must prove to be superior to other learning aids in meeting the teacher's objectives; otherwise it will have no value. The fast-interaction capability of the computer, as well as its capability to provide immediate, non-critical, concept-related visual feedback are two other features Stevens advises to look for.

The following guide questions have been designed to assist the language teacher in evaluating CALL courseware. The questions assume the teacher has already decided on her pedagogical assumptions and objectives. A program which results in a majority of yes replies to the questions should be one which is in tune with the assumptions and of greatest benefit to the students.

TECHNICAL/HARDWARE

1. Do you have the appropriate hardware?
How many computers do you have per student? Will the program be effective with that number of students?

2. Is there a comprehensive guide or manual available for using the program? Does it tell you how to do everything the manufacturer claims can be done with the program? e.g. adding information, cutting off sound, etc.

3. How much typing is necessary? Would this amount of typing detract from the linguistic task? Is it desirable?

4. How long does it take to get from one section of the program to another? Is this and any other waiting time between screens an acceptable amount of "non-productive" time?

5. Are there sound effects? Could they be embarrassing or bothersome to students? Is there an option to turn them off?

FORMAT

1. Does this program offer a variety of short activities? If it is one long activity, is it broken up into short segments?

2. How long is each activity? Too long? Could students get bored or impatient going through all of it or is it an acceptable length for them?

3. Is there consistency in the layout of the program ? Are the questions, answers, scores in the same spot each time the screen changes so that the eye can easily zoom in on what it's looking for?

4. Is it easy on the eyes? How legible is the program? Is text double-spaced or are there large letters? Too much flashing, inverse printing or print can be difficult to read and quickly result in tired eyes. Has this been avoided?

5. Does necessary information remain on the screen? e.g. How do I quit? How do I get help?

6. Does the program make use of any of the visual, animated features of the computer? Are there any graphics?

7. Do questions which the student has gotten wrong come up again? Is this something you want?

8. Are the questions presented randomly or is the sequence the same each time? Is this desirable?

STUDENT CONTROL

1. Can the student determine the level of difficulty of the activity?

2. Can he choose the type of exercise or material?

3. Can he choose the pace?

4. Can the student easily get into another section of the program, (a different activity or a different level)?

4. Can he choose to quit?

6. How many attempts at the right answer is the student allowed? Is this desirable?

7. Can he choose to get help in the form of a clue or a review of grammar rules involved?

8. If the review of grammar appears automatically after more than a specific number of mistakes, can the student easily get back to where the program branched off?

9. Is there any indication on the screen to the student of the number of questions or the amount of time remaining in the activity?

10. Can the learner stop in the middle and start up at that point again on another day or is he forced to go through the whole program from the beginning?

11. Can he go back a question or two if he wants?

12. Is it easy for the student to edit his answers or correct typing mistakes before the answer is processed?

LINGUISTIC CONTENT

1. Is the vocabulary, grammar, subject matter of the program relevant to the student's age? needs? curriculum level? rest of course?

2. Are the contents of the program; the words, sentences, available in printed form to the teacher? e.g. program advertises 500 words. Which words are they? Does the teacher have to go through the entire program to find out?

3. Can the teacher add his own data to the program?

4. Are the instructions written for the student's level of proficiency? Are they clear and concise? Are there examples?

5. What type of presentation is there? Multiple choice? Fill-in-the-blank? Does the mode suit the material?

6. What language or language learning skills are being practiced? Does this correlate with the student's needs? objectives?

7. Is the language used or answer expected constrained in anyway to fit the medium? e.g. Answer with the simple perfect tense only, though in some cases the progressive perfect would be more natural.

8. Does the exercise include exceptions?

9. Is there only one answer which is recognized as correct or does the program allow for alternative answers?

FEEDBACK

1. Is the type of feedback consistent with your assumptions on the amount and type of feedback desirable for the class? encouraging? personalized? exaggerated?

2. Does the feedback merely indicate that an answer is incorrect or does it include an explanantion or analysis of the student's mistake?

3. Does the feedback reinforce correct responses? Sometimes it's so much fun to see the man get hanged in HANGMAN or some humourous graphics display, that students will purposely answer questions incorrectly.

4. Is there additional help if the student gets something wrong repeatedly?

5. Is there a running total or a score?

6. Is there appropriate feedback if the student's answers differ from the programmed answers or contain

insignificant typing errors? Does it avoid telling the student he's wrong when he's not?

INTERACTION AND MOTIVATION

1a. Does the program encourage interaction among students? Does it provide serious competition or encouragement to cooperate? Does it provide a meaningful language context for the interaction ?

1b. Does it require individual, one-on-one (one computer/one student) study?

Which do you want? In what type of learning environment, alone or with others, would the program be most effective?

2. Does this program offer meaningful interaction between the user and computer? Or is it a "page turner" for the student with minimal amount of action required on his part?

3. What points in this program hold the interest of the user?

4. Does the computer enhance this activity? What advantages does it offer over using the blackboard or paper for the activity?

SUMMARY

Evaluating anything entails developing a critical eye. With sofware, the best way to do this is to observe the student's and the computer's reactions. Recently, I used a concentration type of match game to practice antonyms with some elementary students. I was quite excited about the program at first, but in using it, I became aware of one fault. The computer proclaimed two words a match so quickly that the students often did not have the chance to realize this themselves, thus robbing the students of their own acknowledgment and confirmation of having found the correct antonym. I had to admit to myself that the computer did not enhance the learning activity in this sense. But the lit-up eyes of the students when they saw "Congratulations Frank, you've won the game!" was a motivational factor that I had never been able to create in my classroom with index cards. It is this type of situation which calls for the ability to weigh the advantages and disadvantages of the program and make a decision as to which are more important in ensuring the greatest benefits to the students

USING THE COMPUTER IN THE CLASSROOM

Once the courseware has been evaluated and judged to be in keeping with the assumptions of the teacher and the needs of the students, the next consideration is how to best use it in the class.

The first step, as when choosing any class activity, is for the teacher to be very clear about her objectives. She must decide what is to be achieved and how the computer will help to do this. These objectives are always the first points to consider when choosing a program and when deciding how to use it in class.

The actual procedure of the activity will necessarily depend upon the number of computers and the number of students in the class. Logically the most difficult problems arise when there is only one computer and possibly twenty-five students: even this situation can offer interesting possibilities.

A commonly held misunderstanding about CALL is that one student uses one computer. This is, however, not really natural behaviour around a computer, as scenes in retail stores testify. It is customary for a group of people to stand around a computer, offering suggestions or warnings to the person operating it. Thus a sort of fish bowl effect arises as the person at the terminal performs the operations and the others work, quietly or not so quietly, along with him.

Small groups or pair work is a standard configuration for activities in the language classroom in order to provide more time for communication in the target language or to enhance positive relationships among the members of the class. This practice is just as effective when more than one student is working with a computer. The interaction with the computer provides a context for more interaction among the students.

If the teacher is not aiming at individualized instruction, any of the programs, including drill and practice and quizzes can be used by more than one student. In this way students can learn from each other. Though it is always possible for one person to play a game against the computer, two or three students united in an effort to outwit the computer will find themselves involved in a great deal of meaningful communication in planning their strategies.

Many games have been designed to be played by more than one person. Simulations and synthetic generation programs have also been designed with more than one learner in mind and though a single student could use these programs, they are definitely most effective with a group. The exchange of knowledge while analyzing what the computer knows is very important to the process of language learning.

Even when programs are not designed for pair work, students have shown that this is a preferred method of working. Johns (1982:104) tells of his experience with the program JUMBLER:

> Although in writing the programs I had anticipated single students playing against the computer, in practice they preferred to play in pairs; the resulting discussion of the texts and of the possible answers clearly had a beneficial effect.

There are various ways in which a whole class can make use of only two or three computers. One solution is to incorporate the computer into the class simply as one of the day's group activities. A teacher can plan three or four group activites whereby the groups rotate every ten to fifteen minutes. In this way each group can have time at the computer.

Should a teacher have only one computer, it can be used as a context for discussion with the whole class or in smaller groups. When determining whether a program is suitable for this, one must take into consideration the size of the print and the amount of reading necessary. Any program which involves a lot of reading is not appropriate as students sitting at a distance cannot read what is on the monitor.

A program such as S-ENDINGS (See exploratory programs) would be suitable as only one or two words appear on the screen. The whole class can work together

determining which rules the computer knows or they can work in small groups, taking turns testing the computer with words of their choice and then comparing the conclusions of the groups at the end of the session.

Even a simulation can be played with only one computer and an entire class. I once observed a class play a geography simulation in which the students were divided into teams of crew members of ships whose objective was to sail across the Atlantic and find America before the others. Within their groups, the students had to choose a captain and assign each member of the crew a role or job. Each team took turns going to the computer to receive pertinent information about their ship's position at sea including such things as a weather report, inventory of supplies, and possible dangers lurking at sea nearby.

The information was displayed on the screen for only a very short time, so each crew member was responsible for finding and remembering the information pertinent to his role. The team then sat down and planned their strategy based on the information each member had received, while the next crew went to the computer to make some move and receive more information. Each groups's allotted time at the computer consisted of moments, but the planning and communicating that resulted could have gone on for days.

A second preconception about computer work is that a teacher is not necessary; a thought that goes hand in hand with the idea that computers can replace teachers. After having read this far into the paper, it is hoped that the reader will no longer have such misconceptions. A teacher should always be present. She is still very necessary to answer any questions or guide the students in discussions or possibly have them verbalize their strategies and experiences, depending on how the computer is used.

A fundamental role of the teacher is to give instructions. Even though most programs contain lengthy written instructions, the students should be spared the necessity of reading these instructions for two reasons. First, the linguistic level of the instructions, if they are given in the target language, is often far above the level of the program, and consequently also above the linguistic level of the students. Secondly, having to read the instructions delays getting to the task which can create impatience and decrease the student's initial enthusiasm. People love to play games but seldom are they prepared to learn how to play. The teacher can easily relieve the students of this chore by giving verbal instructions beforehand.

Suggesting group and pair work activities and the teacher's presence while working with the computer has

been a small attempt to give the reader some food for thought on using computers in the classroom in a manner with which they have not traditionally been connected. There are many activities possible in preparing for or following-up work on the computer but they are not the subject of this paper. It is my hope that educators will nurture the seeds of thought sown here to help the use of the computer develop to its full potential as an effective tool in the classroom.

CONCLUSION

My intention here was to give readers an introduction to CALL which would clarify and dispel some misconceptions, thereby making possible further investigation into the use of the computer. Only with openness and some basic knowledge can one attempt to answer the questions posed at the beginning of this paper. Does the computer have any inherent qualities that distinguishes it from other technological aids? Does it meet the specifications of a tool which trains students in language learning strategies? Is CALL based on any pedagogically sound theories of learning? What is its potential? Answers will vary from individual to individual, depending on personal assumptions about teaching, learning and language.

In all fairness, time as well as thought must be given to these questions. Both the microcomputer and CALL are considered to be in the infancy of their development. Besides advancements in the hardware and software, exploration and experimentation in the classroom will bring about new perspectives on the use of the computer.

I imagine the reader less intimidated now, but still uncertain about the next step. My suggestion is to find the computer room at school or the local retail store and

walk in; that is the hardest part. It's never a problem finding someone who will help with loading in a program, so it shouldn't be hard to have a look at some language-related software. It is best to preview a variety of programs, as this will give a clearer picture of what is meant by the computer's interactive powers. Just looking at what is commercially available for the foreign language learner offers a somewhat limited view.

The appendix contains a list of software manufacturers who will gladly provide the reader with brochures of language programs not found in retail stores. Though this opens new avenues of information about CALL, the problems are not so easily solved. Only through the efforts of informed teachers, who are open to looking for new and creative ways for using the computer and adapting software to the needs of the students, will the questions about the potential of the computer in the language classroom ever be answered.

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APPENDIX

RESOURCES FOR FOREIGN LANGUAGE AND ESL SOFTWARE

Resources for Foreign Language and ESL Software

Information about the programs, WORDPACK, JUMBLER, BLEEPER, MASKER, MURDER, LOAN, CLOTHING STORE, CLOSE-UP, DISCLOSE, STORYBOARD, S-ENDINGS, can be requested from:
The British Council
Center for Information on Language Teaching and Research
20 Carlton House Terrace
London SW1Y 5AP
England

WORDPACK is available from:
WIDA Software
2 Nichols Gardens,
Ealing, London, W5 5HY
England

All programs in this paper, not listed above are commercially available in the U.S.

U.S. Software Manufacturers

Acorn Software Products Inc.
1945 Gallows Rd.
Suite 705
Vienna, VA 22180
(703) 556-9788
French, Italian, German, Spanish

Advanced Operating Systems
450 St. John Rd.
Suite 792
Michigan City, IN 46360
(317) 298-5400
Many languages

Avant-Garde Creations
P.O. Box 30160
Eugene, OR 97403
German

Compu-tations Inc.
P.O. Box 502
Troy, MI 48099
(313) 689-5059
German, French, Spanish

Conduit
100 Lindquist Center
University of Iowa P.O. Box 388
Iowa City, IA 52244
(319) 353-5789
Spanish

Developmental Learning Materials
P.O. Box 4000
Allen, TX 75002
ESL

Education Activities, Inc.
P.O. Box 392,
Freeport, NY 11520
(800) 645-3739, in NY, AK, HI (516) 223-4666
ESL

George Earl Software
1302 S. General McMullen
San Antonio, TX 78237
(512) 434-3618
Spanish, French

Gessler Educational Software
900 Broadway
N.Y., NY 10003
(212) 673-3113
Many languages

Hart, Inc.
8 Baird Mtn. Rd.
Asheville, NC 28804
(704) 645-4734
English, German, French, Spanish, Latin

International Software (Lingo Fun)
P.O. Box 486
Westerville, Ohio 43081
(614) 882-8258
Many languages including Italian, Chinese, ESL

Jagdstaffel Software
345 Brenda Lee Dr.
San Jose, CA 95123
(408) 578-1643
Japanese Katakana, Russian Cyrillic

Krell Software Corp.
1320 Stonybrook Rd.
Stony Brook, NY 11790
(516) 751-5139
German, Dutch, English

Learning Well
200 South Service Rd.
Dept. 21
Roslyn Heights, N.Y. 11577
(800) 645-6564, in N.Y. (516) 621-1540
English

Micro Learningware
P.O. Box 2134
North Mankato, MN 56001
(507) 625-2205
German

Microcomputer Workshops Courseware
225 Westchester Ave.
Port Chester, NY 10573
(914) 937-5440
English, Spanish, French

Milliken Publishing Company
1100 Research Boulevard
P.O. Box 21579
St. Louis, MO 63132-0579
(314) 991-4220
English

Powersoft Inc.
P.O. Box 157
Pitman, NJ 08071
(609) 589-5500
Many languages

Program Design Inc.
11 Idar Court
Greenwich, CT 06830
(203) 661-8799
French

Schoolhouse Software
290 Brighton
Elk Grove, IL 60007
(312) 526-5027
French, German, Spanish

SEI (Sliwa Enterprises Inc.)
2013 Cunningham Dr.
P.O. Box 7266
Hampton, VA 23666
(804) 826-3777
Spanish, German, French

Spinnaker Software
215 First St.
Cambridge, MA 02142
English - Elementary

Synergistic Software
830 N. Riverside Dr.
Suite 201
Renton, WA 98055
(206) 226-3216
Many languages

The Professor
959 N.W. 53rd St.
Ft. Lauderdale, FL 33309-9990
(800) 222-1399
Many languages

The Regents/ALA Company
Two Park Avenue
New York, NY 10016
(800) 822-8202, in NY, AK, HI (212) 889-2788
ESL

Tycom Associates
68 Valma Ave.
Pittsfield, MA 01201
(413) 442-9771
French, German, Spanish

Xerox Education Publications
245 Long Hill Rd.
Computer Software Division
Middletown, CT 06457
English - elementary children

Computer Journals of Interest to Language Teachers

Creative Computing
Reviews of English Language Arts programs which can be used for ESL learners

CALICO
Brigham Young University
Provo, Utah

Classroom Computer Learning
5615 W. Cermak Road
Cicero, IL 60650