C.A.L.L. VERSUS THE NATURAL USE
OF TECHNOLOGY

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1.0　The Impact of Language Laboratories on CALL and CAI

There are two ways in which the computer has been conceived of and used as a tool in CALL labs. The first of these conceptions can be called 'traditional' and is based on ideas related directly to the original language laboratories and the use of tape recorders (or other devices) as teaching aids. The second conception can be called 'modern' and is a product of a shift in the linguistic theories underlying language teaching and the changed goals that these theories dictate. After characterizing these two conceptions and showing how they are different I will describe one important similarity between them.

1.1　Traditional Laboratories

Early language labs were introduced as "the great cure-all instructional settings for language learning" (Banno, 1989 : 3). Ryan (1988 : 35), in describing the historical development of language laboratories, notes that the first use of the term "language laboratory" occurred in 1930, and she also gives brief analysis of the reasons that language labs flourished:

> There are two elements in its development, one linguistic and the other technical. The linguistic factor was the influence of Skinner's behaviorist theories on language teaching and the concept that drilled patterns which made the learner form good language habits were the only foundation for good language use.... On the technical side, the vital factor was the arrival in the fifties of the portable tape-recorder which could be linked up with others in a classroom, and which allowed the student to record his own voice (and

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John D. Dennis

subsequently erase it) on to the master programme.

Earlier versions of the tape recorder were used before the fifties, and there were also attempts to use radio gramophone records for this kind of preprogrammed, behavioralist-minded language instruction. Interestingly, early language lab programs were hampered by "an acute shortage of materials" (Ryan, 1988 : 36), and teachers are described as "trying to find time to make suitable material for their own use" (Ryan, 1988 : 37). This is a problem that has repeated itself today in CALL labs around the world: plenty of machinery but not enough software that will do what teachers would like. This shortage of useful instructional software touches on one of the central ideas of this paper and will be addressed more completely in a later section.

The ideal course of study in these labs was self-contained, self-explanatory, and self-paced, and teachers were left with the role of monitoring student progress and offering occasional advice. Students interacted with their tape machines in study carols designed to isolate individual students one from another and from the teacher. Tape recorders were even considered to be potential replacements for teachers, who felt threatened and were worried that this new technology would eventually put them out of a job. Audiolingualism focused on spoken language and placed a heavy emphasis on grammatical correctness. As a result, students using tape recorders practiced pronunciation and grammatical patterns by means of drills--mechanically repeating words and phrases. They practiced asking or answering questions through the use of substitution and transformation drills. Another common drill was the 'exploded dialog,' in which a conversation was recorded with pauses after each section so that the student could repeat what had been said. After this kind practice students would "progress" to a similar conversation only half of which had been recorded--the students being expected to fulfill the conversational role missing from the recording. Again, each student practiced these drills by himself, individually operating the tape machine installed in a study carol.

Unfortunately, this concept of the traditional language lab has frequently been updated simply through the substitution of modern computers for the now old-fashioned tape recorders. The result is a CALL lab that functions in the same way as a traditional language lab that uses audiolingual methods. As Jones and Fortescue (1987 : 5) state:

It is still common to find computer-assisted language learning (or CALL) described as a means of 'presenting, reinforcing, and testing' particular language items: the learner is presented with a rule plus examples, and then answers a series of questions which test his knowledge of the rule, the computer giving appropriate feedback and awarding a mark, which may be

stored for later inspection by the teacher.

Just as tape recorders were used as audiolingual tools of instruction in the not too distant past, it is computers that are being used today to fulfill the same function. The principles of the student-machine relationship that characterized traditional language labs has been maintained in many newly constructed CALL labs. Computers, rather than tape recorders, are often seen as potential teacher substitutes, or at least as threat to the status of teachers. It is now a computer rather than tape recorder that engages students in various kinds of drills and pattern practice. And although cubicles and other barriers to student-student interaction are now less common, much CALL software still presumes a single student will be interacting with the software on a single computer, rather than engaging in a discussion of some computer-generated topic with other students or the teacher. Finally, because of the high cost of computers, allocating one machine per student usually makes a complete CALL lab prohibitively expensive, or at least so expensive that school authorities almost never give students the kind of free and independent access to the computers that they ought to have. This characterization of what I have called the traditional view of either CALL or language laboratories can be contrasted with more recent developments in the use of technology.

1.2 Modern Language Laboratories

The modern conception of language labs is such that these labs are no longer thought of as instructional "cure-alls" but as occasionally useful aids for language instruction. Rather that replacing teachers, language labs are now seen as a kind of accessory that can aid, complement, or provide a stimulus for classroom instruction. The course of instruction in language labs, if it can be called that, is no longer self-contained. Language lab instruction is linked directly to the classroom context through various kinds of discussions or problem-solving activities (Ryan, 1988 : 37 − 8), and no longer relegates the teacher to the role of mere technical supervisor. Jones and Fortescue (1987 : 99) describe this improved situation by stating that:

> In other words, the lab has become a rich linguistic environment where learn-
> ers can be exposed to and increase their knowledge of the target language....
> In such a laboratory, oral work still has a place, but it is far more commu-
> nicative: instead of chanting repetitious drills, learners work in pairs on
> writing and recording dialogues.... This language laboratory has little in
> common with the lab of the sixties. The equipment is similar, in some cases
> identical: but the way in which it is used is very different. The language

4   John D. Dennis

laboratory has become a medium that can be used with a variety of teaching
methods and for a variety of purposes. It is no longer a method in its own
right, nor is it inextricably linked to any one method.

Thus, we can see that while language lab equipment has changed very little, attitudes
towards its use have changed rather drastically.

The modern conception of how the computer is to be used as a tool in CALL labs
is analogous to the modern conception of how language labs are to be used. In this
way Jones and Fortescue (1987 : 5) state that the computer should be used "as a
flexible classroom aid," that it should be directly integrated with classroom work,
that its use should "only rarely involve individual work at the keyboard," and that
the interaction among a group of learners using a computer is as important as
their interaction with the computer itself. Changing theories of language learning and
the emergence of the notion of communicative competency have placed a higher value
on interaction among students and a lower value on the benefits of working directly
with a machine, however sophisticated it may be. Also, it is important to emphasize
that the shift in perspective from the traditional conception of the proper use of the
laboratory to the modern one has been a shift from seeing the laboratory present a
self-contained course to seeing it as presenting one component of a course or simply
supplementing regular classroom work. The traditional laboratory tries to use its
hardware--whether it is tape recorders or computers--as the exclusive component of a
course of instruction. The modern laboratory, on the other hand, uses its hardware
to complement and supplement regular classroom work, in a way that integrates this
resource into broader curriculum goals.

1.3 Similarities

While the traditional and modern conceptions of the role of the computer in CALL
labs are quite different in many respects, it is important to examine and discuss one
strong similarity between them. Simply stated, both of these perspectives conceive of
computers as *instructional tools*. Indeed, this is the case for all of the equipment
typically found in a language lab or classroom. Whatever kind of equipment it may
be--electronic (such as computers, audio cassettes, and video equipment), print materials
(books, maps, pictures, charts, diagrams, etc.), or props and visual aids--this equipment
functions within the lab or classroom as a set of instructional tools to be used by the
teacher.

As we have seen, the traditional conception of a language lab casts the equipment
as the exclusive tool of instruction and associates it with the audiolingual method.
Although the modern view of a language lab casts the equipment as a kind of

supplementary or auxiliary tool available to teachers and does not associate it with any particular teaching method, at a different level it is important to note that the equipment is still used in the role of instructional tool. The technology, whether it is old or new (tape recorders or computers), is still cast as a resource or teaching aid to be used within the limits of the classroom. For example, Jones and Fortescue (1987 : 5) state initially that "we shall present the computer as a flexible classroom aid," and later frequently indicate throughout their book that the computer can be thought of as a flexible resource if it is adopted as one part of an overall lesson plan. Molholt (1988 : 92) also can be seen to conceive of the computer as tool when he describes the advantages of an advanced computer system by saying:

> Traditional methods of communicating with students about pronunciation rely heavily on subjective evaluations or, even in the best of language labs, on student recognition of the differences between their pronunciation and that on the master tape. Many errors go unchanged.... With a computer display of pronunciation comparing a native speaker's model with attempts to match it, we can instantly show students objective information about the location, extent, type, and significance of the error, as well as the progress made in correcting the error.

Though this approach is perhaps far superior to other means of instruction discussed by Molholt, the computer is still being used as a tool of instruction. In other words, although this computer-based instruction may be a much better mousetrap, it is still being used to catch mice.

1.4 The Conception of Technology in Language Teaching

A large number of people are involved in the application of modern computer technology to language teaching. These people, whether they are teachers or administrators, almost universally ask the same fundamental question about CALL. This question is *"How can we use computers to teach language?"* More accurately, one might say that the underlying form of this question is "How can we use computers *as tools* to teach language?" This is due to the fact that within language teaching circles the perception of the computer-as-tool is not only common or prevalent, it is pervasive. In fact, it is so ingrained that other, similar questions are really just transformations of the same idea. Alternative ways of phrasing this fundamental question are: "How can CALL best be implemented?" or "What is the best type of CALL system?" Banno (1989 : 3) phrases this idea as a statement when she says "In order for students to make progress in learning, teachers have to make the best use

of CALL. Teachers have to know the possibilities and limitations of CALL in order to best utilize it in their classes." Jones and Fortescue (1987 : foreword) say that teachers "want to know how computers can help in the everyday business of language learning."

Unfortunately, this perspective brings with it a number of problems, problems which have not been adequately discussed in the literature on this topic. The concept of computer-as-tool is solidly based on the metaphor of the language laboratory and a certain view of technology. Due to this metaphor computers are often seen as the superbly engineered big brothers to tape recorders, improved through technology in a way that will somehow allow us to make a quantum leap past the problems associated with those now unpopular dinosaurs of the past. All too often, this new technology has only served to resurrect those dinosaurs in a more expensive, modern form--personal computers that are now being used for structure drills, pattern practice, and other techniques associated with behavioral conditioning and audiolingual theory.

While there are many real benefits to be gained from CALL when it is used in the more modern way described above, and while these benefits have been clearly and forcefully articulated in the many publications on this topic, it is important to see that the concept of computer-as-tool restricts the role that these devices can play in the linguistic lives of students. The concept of computer-as-tool restricts student perceptions of the nature of communication by not presenting the computer in a natural way, and it limits the ability of students to use their language skills to perform tasks after they leave their schools.

These issues can best be illustrated by recalling the question that is typically the starting point for discussions about CALL: "How can we use computers to teach language?" In order to see the principles upon which we might rephrase this question we need to recall the earlier listing of the different kinds of resources and equipment used in language labs and classrooms. That list included but did not focus on one very common set of materials : books, paper, and pencils. Rather than simply asking the typical question about how computers can be used to teach language and moving on to give an answer, it is enlightening to check our reaction to almost the same question when it is asked about books, paper, and pencils. Instead of asking how computers can be used to teach language, the question becomes *"How can we use books, paper, and pencils to teach language?"* When the question is stated in this way it appears rather foolish, since it would seem that anyone who has ever been to school wouldn't even begin to ask it in this manner. But why is this the case? There are two possible reasons that might explain our reaction to this rephrased version of the question.

First of all, books, paper, and pencils are just about the most common schoolroom tools in existence. Without them, a place might not even be thought of as a school. Has

the reader of this paper ever heard of a school without these things? Second, it is possible that the question could be asked by a person from an illiterate culture--a culture without a written form of language. Such a person would have no awareness of the uses of literacy and would not be able to conceive of the broad influence written culture could have. But this illiterate culture would have to be very remote, since even an illiterate person in a literate culture should be aware of the potential represented by books and writing.

Instead of asking how books and writing can be used to teach language, a more 'natural' way of looking at things might be reflected in a question such as "How are books and writing a part of language competency?" or "How are books and writing a part of normal communication?" When asked in this way the question seems to make sense, and it reflects a view of reading and writing that is taken for granted by everyone connected to language teaching: reading and writing are two of the four fundamental language skills, and if we didn't teach those skills we wouldn't be teaching properly. Also, we can see how trying to answer these questions might appeal to scholars from certain other disciplines. In a nutshell, questions phrased in this way hold the key to an alternative conception of the role of computers in language and language teaching.

Turning now from print to modern technology, it should be easy to see that the common question about computers and CALL (How can computers be used to teach language?) can be rephrased in a better way by asking "How are computers a part of language competency?" or "How are computers a part of normal communication?" There are several advantages to asking this kind of question about the function of computers. First, there is a new way of looking at the role of computers in language use and in normal communication. Briefly stated, this creates an alternative to the computer-as-tool perspective described above. By recognizing that computers have become important vehicles for modern communication--especially certain types of communication, a topic I will return to below--we can better prepare our students for the communicative tasks they will face after they leave the classroom. Also, by asking about the role of computers in this way the conception of the computer as an instructional tool is neither excluded nor lost, it simply becomes an alternative way of seeing computers. Computers can still be used as teaching tools, in either CALL labs or classrooms, but while in the past they have been used exclusively as instructional aids, students can now also be shown how they serve as a common channel of communication.

To summarize the discussion in this section, I have described two conceptions of the computer in CALL and language teaching. These were labeled "traditional" and "modern," respectively. They were shown to be similar in the way that they conceived of the role of the computer in language teaching. A third, alternative conception was suggested that recognizes the role of the computer as a common channel of communi-

cation. Thus, we have moved from: (1) having technology isolated in the language lab and used in a specific manner, to (2) the integration and use of those tools as a supportive part of classroom study, and finally to (3) seeing this technology as a normal part of communication.

2.0 Technology and Writing

In this section of paper I will look first at technology to see how the term is defined and used in research which concerns itself with the application of technology to language. I will then make some general comments about writing before relating each of these language. At least to begin with, while it may be safe to assume that the reader of this paper has a reasonably clear idea of what the terms "writing" or "language" refer to, that is not the case for the term "technology," especially when it is applied to language, communication, and information.

2.1 Technology

To get a better idea of how the term "technology" is used, let me begin with a definition of "information technology" that appears in the *Macmillan Dictionary of Information Technology* (quoted in Finnegan, 1989 : 109). According to this definition, information technology is:

> The acquisition, processing, storage and dissemination of vocal, pictorial, textual and numerical information by a microelectronics-based combination of computing and telecommunications.

In interpreting this definition Finnegan (1989 : 109) correctly points out that information technology is seen "as involving the formulating, recording, and processing--not just the transmitting--of information." However, Finnegan does not emphasize the latter portion of this definition, that which refers to microelectronics, computers, and telecommunications. She does this for two reasons. First, she feels that the clamor and commotion about the coming of a new information age is to a large degree a sensationalistic result of political, commercial, and market manipulation, This sensationalization is often present in both scholarly publications and popular media such as newspapers, magazines, and on television. It is particularly strong in advertisements which frequently tout the necessity of being well-prepared to meet the new information age.

Second, by sidestepping the issue of recently developed technology (microelectronics, etc.) it is possible for Finnegan to extend her interpretation of this definition back-

wards in time to show that "new information ages" have also come upon cultures in the past. She tries to show that what we take to be quite normal or natural today was at one time quite new, and can be seen as having an impact comparable to the recent advent of microelectronics and computers. She argues that what is true of today's new and unfamiliar technology was also true of any new and unfamiliar technology that was introduced in the past. The four criteria that are important to Finnegan's elaboration of this concept are those quoted above: to be judged a "technology," something must be used to formulate, record, process, and transmit (or exchange) information.

One example studied carefully by Finnegan (1989 : 111) shows how early telephone companies had difficulty getting people to understand how to use their new invention. She compares the past attitudes and reactions to the introduction of the telephone with the present attitudes and reactions to the introduction of the computer. She concludes her discussion of this example by saying that:

> At one point, it was...telephones that were the inhuman technologies bringing
> an impact--even threat--for normal human life, and which people had to learn
> with some difficulty to adapt.

After making the same point about other forms technology, such as television, airplanes, and, importantly, printing and writing, Finnegan (1989 : 112) says:

> Once the new communication systems become accepted (writing, print, telephones or whatever) they come to be regarded as natural rather than artificial.
> So it is indeed important to go on reminding ourselves that even our most accustomed communication systems are indeed human-made and conventional strategies.

At issue here is the way in which things become a natural part of our daily lives, a very broad and interesting topic in its own right, but which can only be referred to briefly in this paper.

The notion that I would like to use in summarizing this process is the idea of the sedimentation of knowledge. Sedimentation of knowledge refers to the way in which knowledge (and the effects that frequently go along with it) is accumulated or amassed by people within a given culture. By the word sedimentation I hope to denote the incremental accretion of experience, the way in which knowledge might be said to precipitate or be deposited in a culture. It is a process in which foreground knowledge, perhaps in some way controversial or uncertain, becomes background knowledge, having gained a kind of acceptance which removes it from constant scrutiny and

questioning. The term "knowledge" should be taken in its widest possible sense, covering tacit or explicit ideas, social or physical behavior and experience, and either logical or emotional apprehension of that experience.

While this process in all its possible forms could be endlessly and variously parceled into different steps, stages and phases, for the purposes of this explanation it should be useful to sketch out one possible categorization. Three general stages in the assimilation and sedimentation of knowledge might be called: 1) the speculatory phase, 2) the introductory phase, and 3) the acceptance phase. Note that these three stages could easily be further categorized into early and late steps--or early, middle, and late steps; or early, early-middle, middle, late-middle, and late....etc.

The speculatory phase is one during which some bit of knowledge is perhaps controversial or in competition with some alternative way of doing something or looking at things. At this stage a certain bit of knowledge or experience has not yet settled down or gained its own niche within the accepted scheme of things. The introductory phase is one during which a bit of knowledge might be said to be making a bid for a place within the accepted scheme of things. Perhaps it has gained qualified acceptance, or has been accepted by a small group or subculture. The acceptance phase is one during which some bit of knowledge which has gained a foothold becomes universally accepted, or at least passes beyond the point of heated controversy.

In practice, this kind of scheme is commonly applied to many topics through the use of chronological analysis, a common rhetorical strategy. In the first section of this paper I categorized language labs and the use of computers in CALL into traditional and modern conceptions. The traditional conception could be seen as being in an acceptance phase, the modern conception as being in an introductory phase, and ideas that were introduced at the end of the first section as being in a speculatory phase. Language classroom scenarios are frequently introduced as past, present, and future views of what has happened, what is happening, and what might be happening soon.

As described by Finnegan, the way in which people of different ages think of modern media also exemplifies these different stages of assimilation and sedimentation of knowledge. The telegraph is something that was always there for my grandparents, but perhaps was new and unusual--the forefront of high technology--for my great-grandparents. Radio was always there for people of my parents' generation, but was something new (and perhaps frightening) for my grandparents. Television has always been there for me, but was something new for my parents. Personal computers are new for me, but will always have been there for my children. Attitudes towards different forms of communication change as they gain acceptance and become a natural part of our cultural consciousness. Each one of these channels of communication was speculatory and innovative at one time, then gained an introductory foothold, and finally was accepted as a part of normal culture.

Besides the change in attitudes towards these forms of communication there is another more relevant example: attitudes towards the typewriter and its keyboard. The first workable typewriter was created in 1828 by William Austin Burt (The Software Toolworks, 1987 : 5). As for typists' use of the keyboard:

> ...the freestyle 'hunt and peck' technique was considered the best way for everyone to create his own typing method... [and] ...though it may sound silly today, this two-finger method remained unchallenged for decades. (The Software Toolworks, 1987 : 8).

By the late 1800s there were several attempts to change people's attitudes toward the use of the typewriter keyboard. One example is a man named McGurrin, who:

> ...had turned his dusty law clerk's office into a typewriting classroom. McGurrin found the venerable "hunt and peck" method far too slow for him to wade through his work. So, each night, McGurrin taught himself what he called his touch typing method. He boldly learned to operate the typewriter, using all of his fingers and without giving a glance at the keyboard. (The Software Toolworks, 1987 : 10)

Another example is M. V. Longley, who developed an "All-Finger Method" of typing. Her method "challenged everyone who operated a typewriter to use all fingers on both hands... It was a shocking idea..." (The software Toolworks, 1987 : 12). The beginning of the 20th century saw the assimilation of the typewriter into American culture. First, while the increasing popularity of typing came to be seen in the fact that "over half the schools in America taught the touch system...," this increasing popularity is also attested to by the fact that between:

> ...1905 and 1915, over one hundred separate typewriter manufacturing companies sprang up. Competition...was fierce. The typewriter had come of age. It no longer had to prove its worth. Now it was merely a question of which brand to buy. (The Software Toolworks, 1987 : 15-6)

And later, "after 1930, people got even pickier about the typewriters they did buy. Typewriters were no longer a luxury or a curiosity, they were a fact of everyday life" (The Software Toolworks, 1987 : 19). Thus, the typewriter had become a fixture of American culture. These quotations show a shift in attitudes towards the use of the typewriter that exemplifies movement through the three phases of the sedimentation of knowledge, from the speculatory phase through the introductory phase to the

12   John D. Dennis

acceptance phase. I will return to the topic of typing in a later section of this paper. However, this is adequate to show how a language-related technology has been absorbed into a culture.

2.2 Writing

The typewriter is only one of the more recent steps in the long and continuing development of writing. It is useful to examine some of the history of writing and writing systems if for no other reason than to show how much we take for granted about this very real and important part of our culture. Of course, by reference to writing one is also by implication making an indirect reference to reading, and in what follows any reference to writing (especially in any general, abstract sense) should also be taken to refer to the correlated capacity for reading. Indeed, it is hard to imagine how either of these aspects of language could exist without the other!

2.2.1 Writing Research

Studies of writing seem to fall into two categories. The first category is exemplified by Sampson (1985), who is studying writing in and of itself, without being directly concerned with the impact of technology on it. Sampson (1985 : 15-18) divides his approach to writing into typology, history, and psychology. Within typology he examines different types of writing systems and their principles, whether certain scripts tend to be associated with certain types of language, and the type of role factors external to linguistic structure play in scripts. He studies the historical development and evolution of scripts under the category history, and he relates this historical study to his first category, typology. Within the category of psychology he questions the efficiency of different types writing, trying to see what makes a writing system "good" or not, and he tries to examine how various writing systems work for those who use them (the mental processes involved in producing or interpreting different kinds of script). Again, while he does consider writing to be an invented tool and not naturally given, studying the relationship of writing systems to modern technology is not a priority for Sampson.

The second type of study is motivated by a concern about the impact of modern technology on writing. Studies of this kind are less concerned with the historical depth of writing (though it is often mentioned) and instead focus more on the results of recent developments of technology. Studies of this type (Finnegan, 1989; Harris, 1989; Havelock, 1989) attempt to analyze the nature and impact of these recent developments so as to make predictions or suggestions about the future--speculation about future trends in communication and what we should or shouldn't worry about regarding these

118

possible trends. The computerization of communication systems is seen as a watershed development in these studies. Havelock (1989 : 88) identifies "the idea that the computer is inventing for us a new language," and notes that it is the development of the computer "that has raised the issue of the behavior of language." Finnegan (1989 : 107) states that:

> ....technological developments have enabled the convergence of computing and telecommunications. Previously, these two were separated not just technically but through being controlled and distributed by different industries and for different purposes.

While focusing on recent trends she is at the same time setting the stage for a subcategorization of her topic. Rather than the three-way division used by Sampson described above, she classifies the problem with regard to its technological aspects and its social aspects. In passing it can be noted that her technological aspect seems to be more strongly associated with writing (or production) while the social aspect seems more closely connected to reading and interpratation.

Next, there are two areas of inquiry that both types of study treat in the same manner. The first of these areas concerns the status of writing as a communication system. Both say that writing is a kind of technology, something that has been invented by people rather than naturally given, such as speech. Among the evidence offered for this claim is the fact that writing does not arise naturally and must be taught. This contrasts with speech, which does arise naturally and needn't be taught. Second, there seems to be no special physiological adaptation that was a necessary antecedent to the development of writing. In contrast with this there are certain claims that a kind of physiological evolution was necessary for the development of speech. Next, the equivalence of speech and writing systems is conventional and arbitrary. Additionally, the equivalence of different writing systems is arrived at via convention, such as in the activity of translation. Evidence such as this is offered to support the general contention that writing is a kind of technology. Finally, Harris (1989 : 99) expresses the common consensus when he says that "...writing is no longer regarded as mere substitute for speech, or as a useful way of preserving and transmitting knowledge, but as an active and powerful cultural agency in its own right." In other words, writing, which may have begun as a reflection of spoken language, has now taken on a life of its own.

The second area of inquiry treated in the same manner by these two types of research focuses on what is called "the teleology issue." The question under scrutiny concerns the progressive development of scripts and the implications of this for the sensitive topic of cultural superiority. As an ideological tenent the discipline of linguistics maintains that all languages are equal in their ability to express ideas, and

14   John D. Dennis

that neither one language nor another is more "developed" or more "primitive" than any other. For a capability such as speech that is naturally given and virtually universal, this does not cause any problem.

However, writing is not naturally given or universal and there is a great variety of scripts and writing systems in the world. Havelock (1989 : 93) discusses the time and effort required to teach different script systems and in this way approaches the notion that some scripts may be better than others. A particularly heated controversy is the status of scripts which represent the sound systems of their languages compared to those that do not. Thus, alphabetic scripts are at least implicitly compared and contrasted with certain syllabic and ideographic writing systems. In modern terms, it may be easier, and therefore cheaper, to use one or another system of writing for communication.

2.2.2 Writing Tools

In the previous section I described how Finnegan separated her analysis of writing into technological aspects and social aspects. Here, I will briefly survey some of those technological aspects. When thinking of writing there are two things that are necessary: something to write with, and something to write on. Typically, when thinking of writing we think first of tools that leave traces, and only secondarily come to the material, also a kind of tool, which can receive, store, and display the traces of writing. Beginning here with this latter category, the first materials to receive writing were undoubtedly natural ones, such as rocks, bones, or leaves and branches from trees. The use of clay tablets was followed by more directly manufactured surfaces such as cloth and then various kinds of paper. The harnessing and development of electricity allowed the continued use of paper, besides permitting messages to be recorded on tape or displayed on screens. Photographic film permits images to be recorded in another way, and, in a small way, contributed to the development of optical media. Recording information digitally, on either magnetic or optical media, is the most recent stage of this developmental process.

Tools which leave traces are what we usually think of when we think of writing. Stylus tools, such as knives or punches, combined with the early use of brushes and paint, stains, or dyes to yield the many versions of what we know as the pen. This was followed by the development of printing. Printing in and of itself is an extremely broad topic, suffice it to say that from its earliest forms to its most recent it has undergone radical changes and improvements. Again, the development of electricity allowed text to be recorded in many different ways, and with the use of light and the concept of digitalization, led to the invention of digital and optical recording.

However, it is not writing tools themselves that have caused such a fuss. The

impact of these technological developments is instead determined by the way in which this technology has been received and used by the people concerned. The popular conception is that computers have brought a "new age" upon us, a new kind of consciousness. We therefore need to look at the function and use of these developments and what kind of attitudes have been held toward them.

2.2.3 Writing Functions

When considering the function of writing there are two main issues that need our attention. The first of these issues is expressed by Havelock (1989 : 96) when he refers to "the consciousness issue." For Havelock, the question is simply "...does a change in communication involve a change in the way you think?" Harris (1989 : 99) expresses the same concern when he says: "According to the modern view, the essential innovation which writing brings is not a new mode of exchanging and storing information but a new mentality." Finnegan (1989 : 113) shows interest in the same idea by saying: "In fact a whole series of political, economic, social, cognitive, psychological, and even moral consequences have been seen as flowing in turn from the sequence of communication technologies through the ages." She later reinforces this idea by saying that "...the way that communication takes place in specific historical conditions, and the wider implications for social and psychological processes, is not just a matter of technology. It also crucially depends on socio-cultural factors developed in specific times and places" (Finnegan, 1989 : 116). Thus, we see that our psychological, social, and political consciousness is strongly connected to the kind of communicative acts that we participate in.

The important contrast in mental states that interests the three scholars quoted here is the kind of consciousness which exists before writing is used in a culture and the kind which comes after writing has been introduced. In a very real sense people inhabit different linguistic worlds depending on whether or not their cultures use writing. This pre-literate : post-literate contrast can be, and often is, expressed in different ways by the diverse range of scholars involved in this kind of research. Here is a short list of possibilities:

1) pre-alphabetic : post-alphabetic
2) limited literacy : full literacy
3) pre-book : post-book
4) pre-printing press : post-printing press
5) pre-library : post-library

Perhaps the reader of this paper feels that one or another of these contrasts is more

or less important, but hopefully he will agree that there is at least some sense in which these contrasts can reflect differing states of consciousness. Less certain, and certainly more controversial, is the question of whether such a progression represents an ordered sequence of human development. In other words, does a culture's movement through these phases of technology mirror a kind of upward progress so that cultures can be ranked according to their level of development? While the answer to this question is not important here, it can be noted that the more radical reply would be that yes, these are successive states in human evolution. A more conservative and reasonable reply would be that while these contrasts do represent the possibility of differing or alternative states of mind, only time can judge what may be more suitable in terms of evolution.

The contrasts given above seem relatively natural, especially since we inhabit or exist within a literate, print-dependent culture. However, two additional versions of the above set of contrasts may seem less natural, since the changes in consciousness that they imply have not yet been fully assimilated. These additional contrasts are:

6) pre-electronic : post-electronic
7) pre-computer : post-computer

The reasoning that involves these additional contrasts proceeds by means of analogy. These are the most recently developed alternative means of communication. If it is the case that the preceding contrasts related to writing and print represent possible and differing states of mind, then these latest developments in communication technology do too. If they can be taken to exist on a potentially equal basis with the preceding set of contrasts, then the states of mind (or types of communication) they represent should be taken into account when teaching foreign language skills to students.

To summarize the discussion in this section, I have described the image of technology that is used by communications researchers. Next, I tried to illustrate how technology becomes a part of our lives through a process I called the sedimentation of knowledge. This process consisted of a speculatory phase, an introductory phase, and an acceptance phase. I outlined two types of research on writing--one type being more concerned with its history and another which is interested in the impact of technology on our communicative behavior. After a brief survey of writing tools I discussed the functions of writing and its effects on our consciousness and state of mind. Finally, I pointed out that contrast between pre-electronic and post-electronic, or between pre-computer and post-computer modes of communication is the most recent development in this series of contrasts, and that it seems different only because it has not yet been assimilated into our lives.

3.0 Technology as a Channel of Communication

In section 2.1, above, I indicated that Finnegan (1989) had focused on only one part of a definition of information technology. She saw the importance of adding to the basic notion of transmission and exchange of information, and in so doing she clearly recognized that technology is also used to formulate, record, and process information. Correctly, I believe, she also paid less attention to recent developments in technology such as microelectronics. Thus, we can see that she is moving away from a narrower, hardware-based conception of communication toward the wider, more firmly established conception that has been used in communications research. While this is the proper direction in which to go, I feel that Finnegan, along with other researchers, has not moved far enough to recognize how technology can be integrated into a broader, more uniform conception of the situation. The problem lies in the terminology used, which tends to restrict the way in which we can think of things. Reconceiving the notion of technology in different terms (a change in terminology) will accomplish two things. First, it places technology on a level equal to other modes of communication, and second, it resolves a problem that results from a strict application of the idea of technology to language.

Here, I would like to describe two possible ways of organizing our thinking about technology and language. One can think of technology within the realm of language, or inversely, language within the realm of technology. Of these two perspectives, the first, technology within the realm of language, is the viewpoint at least tacitly held by those involved in the use of technology for language teaching. In section 1.4, above, we saw that the typical question asked about CALL was *"How can we use computers to teach language?"* Obviously, language is the natural, primary interest for linguists and language teachers. According to this perspective it is technology that is applied to language, and due to this perception technology is seen to be secondary or subordinate to language. Language is the primary concern, and technology is a resource that can help us deal with it. Since language is given a higher priority in this perspective, it can be said that it is language that makes technology possible.

The second perspective, seeing language within the realm of technology, gives primacy to technology and places language in a secondary or subordinate relation to it. Since technology is given a higher priority here, it could be said that it is technology that makes language possible. While this viewpoint may seem strange or counterintuitive to linguists and language teachers, it has been explored and approached by technologists and even communications researchers. In the previous section of the paper I noted six possible variations of the pre-literate : literate contrast used when discussing the consciousness issue--the possibility that people using different modes of communication can be said to live in different worlds, or have different psychological realities. Here

18   John D. Dennis

is the complete list again :

    1) pre-alphabetic : post-alphabetic
    2) limited literacy : full literacy
    3) pre-book : post-book
    4) pre-printing press : post-printing press
    5) pre-library : post-library
    6) pre-electronic : post-electronic
    7) pre-computer : post-computer

It should be easy to see that when going down the list from items (1) to (7), one is generally moving forward in time, and when going up the list from item (7) back to (1), one is generally moving backward in time. Now, if this were an exclusive list I think it would be possible to say that language exists within the realm of technology, and that it is technology that makes language possible. Why ? Because everything on this list is a form of technology. (Item (2) on the list qualifies as technology since it represents a kind of skill, art, or practical science, a way of doing things that has to be taught and does not arise naturally.) However, this is not an exclusive list since it is missing one very important contrast. The contrast that is missing is the one that expresses the human capacity for speech.

The problem created by the strict application of the idea of technology to language concerns the phenomenon of speech. This is the case since it seems very wrong to say that it was a technological development that made speech possible, or that technology was a precondition for the development of speech. Although some researchers have tried to argue for this idea, the arguments are usually weak and unconvincing. In order to attack the claim that speech is not a technological development these researchers try to undermine certain basic axioms held by linguists. First, they try to dissociate language from the kind of ability that "develops naturally" in the 4-6 year old child. To do this it is claimed that there is a great deal of further linguistic development--development directly related to speech--that takes place after a child gains certain basic skill. Also, this conception of a 4-6 year old child's language capability is a grammatical ability while further linguistic development seems to be social. If grammar is the primary criterion then speech is natural and non-technological, but if socialization is a priority then it might be possible to see speech as a skill, art, or practical science--i.e., as a kind of technology. At any rate, this is the kind of controversy that should be bypassed. To do so we need a change in terminology.

The change in terminology that I am proposing here is to use "channel of communication" in place of "technology." With this substitution we can skip the controversial question of whether or not speech is a kind of technology. Instead, speech can easily

be accepted as a channel of communication, and my impression is that there would be little to argue against such a claim. Also, writing (alphabetic or not), print, books and libraries, various electronic modes of communication, and, of course, computers can all be seen as alternative channels of communication. By attaching the definition used above, a "channel of communication" can be taken to be any one of a number of means necessary to formulate, record, process, transmit, or exchange information. By looking at the situation in this way we can see technology as a tool for creating various different channels of communication to complement or supplement that most basic and natural channel, speech. The simple fact that in modern times technological developments are commonly electronic should not exclude these channels of communication from being integrated into a fair, balanced, and unified perspective of the world that we are preparing our students for.

Before I move to a description of the proper approach to computers and how they should be presented to and used by students, there is one more topic that needs to be discussed. The reader might feel that since speech is the most natural and most basic channel of communication that it should have a higher priority than other channels. This may or may not be the case. For certain learners of English, electronic or computer mediated communication might be more important than speech. For these learners it is important to judge the commonality or frequency of use of a channel, and perhaps also to consider its importance or relevance to their future lives and careers. In order to see how this may be the case, we need to look at the diversification of English in the modern world.

4.0 Diversification of English

Under this heading I would like to describe the impact that the spread of English has had on several areas of English language research. These areas are: English as an International Language, English for Special Purposes (ESP), and English for Academic Purposes (EAP). I will look first at the topic of English as an International Language, and will then examine the situation of ESP and EAP together.

Within the last 20 years a certain amount of academic interest has been stirred in the ideas of "World English," "World Englishes," or English as in International Language. This is due to the rise in status of English as a language of communication throughout the world. This rise in status has in turn blurred a common, traditional distinction in English language teaching--the separation of EFL (English as a Foreign Language) and ESL (English as a Second Language). Briefly, the strategy of EFL is to train learners that will only occasionally being using English among native speakers, and it concentrates on less direct skills such as reading and writing at the expense of speaking and listening. ESL, on the other hand, trains learners to use English

John D. Dennis

within a community of native speakers, paying more attention to the functional abilities of speaking and listening and less attention to reading and writing. In the past it has been relatively easy to distinguish these two sub-fields of English language instruction, but today it is becoming more difficult. The cause of this difficulty has been the spread of English language media through certain parts of the world. The spread of English language media is bringing foreign language students into the community of native speakers and bringing their needs and those of second language students closer together. In other words, the spread of media is blurring the distinction between these two groups.

In fact, it would seem that the rise in status of English as an international language coincides with the increasing distribution of English media (and perhaps even the industrial revolution). While at one point English functioned as a language of commerce and political control (the British colonial era) it soon became the language of development and a means of introducing technological change (which is not to say that this happened without certain economic or political transformations). At the beginning of the industrial revolution and during the British colonial era the dissemination of English through print began a process that is continuing today via the widespread distribution of English through various electronic media and even the latest satellite technology. Today, various kinds of entertainment, news, and economic data is available in English in many parts of the world in print, on the radio, on cassette or video, and on television. It is also significant that English textbooks from a number of disciplines are used in many countries without being translated into that country's native language.

Kaplan (1987 : 138) comments that while the spread of Chinese through the Pacific area "happened as a direct result of the spread of people," the spread of English "is not a spread that has been significantly dependent on the movement of people." As for the influences that caused this spread, he says:

> The rapid increase in science and discovery in North Ameica, combined with the increasingly rapid exchange of information world-wide, and the equally rapid development of the computer, secured English as the source-language for information storage and retrieval. Military development, economic stability, research universities, R & D capability, and the invention of computer-networking all coincided, and the nations of North America emerged as both the greatest users and the greatest contributors to the information pool. (Kaplan, 1987 : 139)

Later in his paper Kaplan notes notes that in many countries the business of government is conducted in English, and that in many schools science and mathematics are regularly taught in English. Thus, his work not only points out the diversity of English in the

Pacific Rim and around the world but also connects English to the sciences, technical skills, and economic development. In passing, it can be noted that there is now even a test for this kind of English language skill, known as TOEIC (Test of English for International Communication).

Within the field of English language teaching there are two sub-fields that are heavily influenced by this diversification of English. Cantoni-Harvey (1987), in describing content-based methods of instruction (also known as ESP), outlines areas in the sciences (engineering, math, physics, chemistry, etc.), social sciences (business, economics, communications, etc.), and in other areas (health, aviation, sports, driving, etc.) that have seen some sort of development as specialized areas of instruction within the field of English language instruction. Business communication is very important to Japan, and even a quick glance around any modern office will reveal a number of special channels of communication : telephones, typewriters, fax machines, telex terminals, and finally, computers.

The purpose of EAP is to prepare students for college-level study. Since writing skills are critically important in all academic areas, EAP generally focuses on how to write well. While the primary goal here may be a knowledge of the necessary rhetorical forms and the way to prepare research papers, it has to be said that an increased knowledge of vocabulary may also be required. However, since this "specialized knowledge" is distributed across any number of academic fields the effect is of a general increase in language skills. Additionally, the situation is such in the United States today that just as it is difficult to think of a school which does not use writing (section 1.4, above), it is difficult to think of a university in which one would not use a computer to prepare writing assignments. Therefore, when studying EAP students need to learn how to use the tools of writing in the same way that native speakers use them. This means that it is not enough for students to be taught by computer, students also need to be taught how to use computers as a common channel of communication. A good introduction to this "natural" use of computers for EAP is Michael Barlow's (1987) *Working with Computers: Computer Orientation for Foreign Students.*

A knowledge of how to use computers as a channel of communication is important for international communication--indeed, this knowledge of computers is perhaps more important here than in other areas. International communication is frequently mediated electronically, if not by computer. Computers are not only common but important in the business world, since business communication is frequently prepared on or transmitted by computers. This is especially important in countries like Japan with highly developed economies that depend on international trade. So a knowledge of computers as channel of communication is important here as well. Finally, computers as a channel of communication are important to academic programs of study, both

John D. Dennis

generally, as in the case of EAP, and in specific cases, as in the content areas that typify ESP. While speech may be the most natural and most basic channel of communication, there are cases in which other channels have more importance.

5.0 The Proper Approach to Computers as a Channel of Communication

Before characterizing what I feel to be the proper approach to computer skills it will be useful to recapitulate the conclusions of previous sections of this paper. First, in section 1.0 we saw that both traditional and modern approaches to CALL treated the computer as an instructional tool rather than seeing this technology as a common path of communication. In section 2.0 we saw how technology could be assimilated to become a natural part of our lives, and that since computers had not yet been fully assimilated they did not yet appear to be a "natural" form of communication. In section 3.0 we saw how substituting the concept of "channel of communication" for "technology" could circumvent certain problems connected with the strict use of that term. In section 4.0 we saw how the spread of English has been affected through the use of technology-based channels of communication, and how these channels could be more important than a natural channel such as speech. The first four sections of this paper should thus be taken to support the conclusion that a different approach to the use of computers in English language programs should be developed.

5.1 The Misguided Nature of CALL

While I do not wish to belittle or demean the kind progress that has been made in CALL, either as a field or in terms of the help that it has provided to students of English, conceiving of the computer exclusively as an instructional tool (and not as a potential channel of communication) does a disservice to our students. It does this by unnecessarily restricting the ways in which students are able to communicate, and by limiting their ability to use their language skills to perform work once they graduate and begin their careers. Typical instructional software in CALL--in wich students perform tasks ranging from answering multiple choice questions to reconstructing mutilated text to participating in simulations to playing adventure games--fails to address this need.

The closest that CALL comes to seeing the computer as a potential channel of communication is through the use of word processing applications, but even this type of program is not thought of as adding to the student's communicative ability. From a theoretical perspective the use of word processing programs in CALL has not been integrated into any beneficial overall curriculum goals that can lead students towards a higher degree of communicative competency. The most common complaint about these

programs is that they take time to learn (Banno, 1989 : 5), but the perspective of this kind of complaint complaint compares word processing tasks to such things as guessing missing words and letters, answering multiple choice questions, or playing simple games. Of course the keyboard takes time to learn, as does word processing or any other kind of program. But this process should be seen as offering a communicative and educational potential at least as great as learning how to read or write, rather than evaluating it on the level of an audiolingual drill. Teachers should see students (and students should see themselves) as gaining a language skill comparable to the four basic skills routinely associated with language learning: speaking, listening, reading, and writing. In this way, computer literacy could be seen as a kind of "fifth language skill" after these more commonly accepted abilities.

Another criticism of CALL software is that it fails to "understand" natural language and thus act like an intelligent teacher. Programs are said to be too simple, trivial, and unsophisticated. Again, this approach conceives of the computer as an instructional tool rather than as a channel of communication. Do we ask writing or other channels of communication to understand natural language ? Do we try to make them perform tasks associated with teachers? Obviously, the answer is "no."

The solution to this problem is to use what I will call "natural language software" rather than CALL software. CALL software tends to be custom-made, developed and written for the purpose of language instruction. It is expensive, and there is a relatively narrow selection of programs available. "Natural language software" is software that is used by native speakers of English to prepare for or to perform the work that they typically do using a computer. There are several advantages to using this kind of software.

Generally, when considering natural language software there is a good deal of competition among software companies and developers. First, this means that a teacher or school can choose from among a number of competing programs, shopping for the most suitable product. Perhaps price is most important, or features of the software itself, or compatibility with a certain type of disk drive or computer. This kind of selection is important in itself. Being able to choose from among a number of programs is rather like being able to browse and choose books in a library or bookstore. Custom-ordering CALL software is like choosing books from a catalog--it is difficult to make a good choice because you are given only a limited amount of information. Second, it is possible to chose "best-sellers." For example, *Typing Tutor IV*, distributed by Simon and Schuster Software, has sold over 300,000 copies. I don't have access to the required information, but are there any CALL programs that have come close to this figure? Also, both *Typing Tutor IV* and *Mavis Beacon Teaches Typing* have recived reader awards for excellence in a number of computer magazines. Finally, it is possible to read reviews and evaluations of revised and newly introduced programs before you

buy them.

5.2 Computer Orientation and Basic Literacy

Teaching students how to use computers as a channel of communication is similar to teaching a weakened form of computer literacy. Usually, computer literacy presumes some familiarity with very technical programming languages, but that degree of knowledge is unnecessary for the needs of the typical language student. Teaching this weakened form of computer literacy can be divided into four steps, and even then the fourth step is optional depending on your educational goals.

The first step is a general or initiation to computers and computer systems. While students may already be familiar with computer systems, they will not be acquainted with using them in English, so it will be necessary to introduce enough terminology so that students can follow instructions either from the teacher or by referring to a manual. The second step is a much larger one--students must begin using the computers.

The type of program chosen for this second step should be a typing tutor program similar to one of those referred to above. Even if such a course is not followed to completion, this kind of training is important to establish a feeling of familiarity and confidence with the keyboard. While these programs are a kind of CAI--they are self-contained and student-centered models for self-instruction--they represent the opportunity for the students to work independently on tasks presented by the programs. These programs are confidence-inspiring since they require a kind of mimicry (such as copying an example with as few mistakes as possible) rather than full-fledged writing skills. Also, typing programs produce an ability to type and so open the doors to further skills and a further ability to use this kind of communication. Helpfully, the manuals for these programs are not computer manuals in the usual sense. The manuals are small, non-technical, and simply provide background information about such things as the history of typing, instructions for making backup copies of the disks, equipment required, or the operating principles of the software. Instructions to the user of the program are contained on disk and are only displayed on screen as needed. Since screen space is limited, these instructions are usually simple, direct, and easy to understand. Finally, these programs are designed for learners--people who are not yet fully competent typists or computer users.

The third step is word processing. This can be introduced together with the typing tutorial or near the end of that course. Word processing tasks given to students should initially be as similar as possible to the kind of tasks used in the typing tutorial. The main focus of these tasks should be copying rather than creating text. After copying an example of some sort the students can replace, rearrange, of alter certain information in order to practice specific word processing functions. This should also be an

effective way to introduce the concept of editing.

Depending on the interests of the students and the educational goals of the program the fourth step can go in a number of directions. Possible choices for the kind of software to learn after word processing include a database, a spreadsheet, or a data communications program. A knowledge of databases can be useful in doing library research or sorting many types of data, a spreadsheet may interest economics or business majors, while students interested in electronic mail or bulletin boards may want to experiment with communications. As stated before, this fourth step is optional and depends on student and program goals.

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*Note: Two excellent annotated bibliographies are also available on CALL and CAI. The first of these, "Developing CAI for the Second Language Curriculum," (#915B) is

40 pages long. The second, "Teaching Second Languages with Computers, " (#915A) is 31 pages long. Both list a great variety of articles, books, and other resources. They can be purchased through:

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