While preparing this talk, I couldn’t help thinking back to the first CALICO symposium I attended—6 years ago in Baltimore. At that time, I was almost a total novice with computers, but I had an inkling that they might be of some service in foreign language instruction, and I wanted to find out how we could use them effectively. I remember being impressed with the projects and plans that were described there, but also being very discouraged about my chance of ever being able to accomplish anything similar. For one thing, I couldn’t imagine that my institution would spend on its foreign language program the amounts of money being talked about, and especially for computers, which were supposed to be useful only to disciplines involved in lots of computation. And for another thing, I was still not all that sure that computers really could play a meaningful role in foreign language instruction. After all, language reflects the highest level of human activity, though, and since computers are really only fancy machines, how could they substitute for or even adequately support a real foreign language teacher?

But I kept coming to the CALICO symposia, and each year I learned more and more about how computers could contribute to the foreign language curriculum. I was extremely grateful for the opportunity CALICO gave me to keep up with the progress of projects in computer-assisted instruction, to make contacts with colleagues with similar interests at other institutions, and to learn from their experience. The presentations supplied new ideas, and the special interest group meetings provided the opportunity to discuss issues and projects with colleagues in diverse professional situations, from various states and countries, from public and private universities, from large, medium and small institutions, and from government agencies and the military academies. No other organization that I know of brings together the variety of individuals that CALICO does, all dedicated to exploring the potential of computers and new technology in general, for improving foreign language learning.

Thus CALICO has led me from kindergarten to graduate study, so to speak, in my schooling on computer-assisted instruction, and I hope that
it continues to do so for many who are just beginning to explore the potential of new technologies in our discipline. So I would like to begin by saying thank you—to Frank Otto and his staff for the countless hours of hard work they have devoted to keeping the organization going, to the many persons who have served as SIG officers, and thus have helped maintain the quality of the symposia and the journal, and to all those who have attended the symposia, given presentations on their work, and contributed to the exciting atmosphere of exploration which pervades the CALICO meetings.

I’m certain that every foreign language teacher has a catalog of bloopers made by students as they try to speak or write a foreign language. In German, these are called "Stilbluten," which literally means "style blossoms." This is a very apt designation, because indeed we can regard them as flowers that sometimes brighten our mood as we pore over countless compositions or conduct endless oral proficiency exams. A few weeks ago, I heard two in English committed by non-native speakers of the language, and I would like to share them with you. In the first instance, a reporter on National Public Radio was interviewing the head of a Palestinian family who had been confined at home for several days because of the 24-hour curfew imposed by the Israeli government during the Persian Gulf crisis. He asked how they were coping, and the Palestinian father responded that they were doing the best they could, playing games, watching television, reading, etc. "But actually," he said, "we are stiff bored." In the second instance, a Spanish professor at William and Mary told me about a former colleague of hers at another institution who had gotten upset because she had made some disparaging remarks about the textbook they were using. The colleague had said something like, "Well I don't know what you find so bad about it. I think you’re making a mole out of nothing." Well, I hope that you won’t be "stiff bored" by what I have to say today, or feel that I am "making a mole out of nothing."

The title of my talk, "Tomorrow's Foreign Language Textbook: Paper or Silicon?" addresses one of the most important issues facing those of us who believe in utilizing new technologies in support of our teaching—and that is, what function should the computer and its peripherals serve in the foreign language curriculum? Should it play only an ancillary role, with the printed textbook remaining the principal vehicle for organizing the course structure, presenting grammatical information, providing skill-building activities, etc.? Or should the computer now become the nucleus for language learning, taking over most if not all of the functions that have up till now been performed by the textbook and its extensions? Let us try to answer these questions by examining the strengths and weaknesses of each
medium—the printed page vs. the computer, and determining which of the two can perform various jobs better.

Probably the greatest advantage of the printed textbook over most computers is that it is portable and does not need to be plugged in anywhere to work. It also is very easy to operate—one simply opens it and turns the pages. It is familiar to teachers and students, and thus they do not feel threatened by it. It is inexpensive in comparison to computers, although to be fair we probably should compare its cost to that of the software, rather than the computer. And it does not lend itself well to wholesale copying as most computer software does, so publishers are assured of selling very nearly as many copies of a book as the number of students taking the course.

On the other hand, the printed textbook has many disadvantages in comparison to computer-based courseware. One of the most serious is that the print medium is immutable. A printed textbook must always present the same materials in the same order—that is, until a new edition is published, which then simply substitutes another fixed structure for the previous one. Thus it forces teachers and students to conform to its pattern, to follow the sequence in which it presents information, and to submit to the learning philosophy embraced by the authors. We have probably all cursed certain aspects of whatever foreign language textbook we happen to be using and wished that we could change parts of it. Just to give an example, the static nature of the textbooks for elementary and intermediate German has recently become a source of frustration for teachers, because the reading passages and cultural capsules do not yet reflect the momentous changes in Berlin and the unification of East and West Germany into one country.

Another disadvantage of the printed textbook is that it is silent. By itself, it cannot present examples of the sounds, intonations and rhythms of a foreign language. Of course, the language laboratory was supposed to make up for this deficiency by providing audio recordings which would enable students to practice the spoken language independently. But generally, students regard work in the language laboratory as dull and tedious, because they must listen to monotonous repetition of the same materials they have seen in their textbooks or gone over in class. Because their work in the lab generally comes after their initial introduction to a topic, sometimes considerably after, no immediate connection exists between their first encounter with new materials and extended aural practice with them. In my view, it would be much preferable to offer a learning tool which integrates text, sound and images into a seamless presentation, and thus enables students to work with a language holistically at all times. As you may have guessed, I
am leading up to one of the most exciting recent developments in computer applications—multimedia.

The printed textbook is theoretically well suited for individualized learning, because each student has his own copy and can read it at his convenience. In actuality, however, students are very tightly bound to following the class schedule in utilizing the textbook, because it is only in the classroom or in the audio programs scheduled in the language lab, that they can hear what they are supposed to be learning. If they stray from the prescribed path, they have no external support for their inquiries. Wouldn’t it be preferable to provide them opportunities to explore other avenues at will, to branch off from what the classroom instructor happens to be covering at the moment, if something happens to point them in other directions? A more flexible instructional program would enable students to pursue instantly paths to information about other topics, to explore related grammatical structures or vocabulary, or to engage in extra practice on materials covered previously. As you can tell, I am leading up to another exciting recent development in computer applications—hypermedia.

My assertion then is that we should no longer be satisfied with the printed textbook as the foundation for foreign language instruction, but rather should aggressively pursue development of what I would call "electronic textbooks," i.e. computer programs that combine all the components of a foreign language course into a comprehensive, integrated package. Such programs would include not only text and pictures, to which the traditional accessible audio materials, visual images, and motion video segments. And above all, such programs would provide the users, both instructors and students, with maximum flexibility in utilizing and exploring these materials.

Let me enumerate several features that an "electronic textbook" should include in order to offer a superior alternative to the printed textbook for foreign language learning.

1) It should present information on the grammatical structures of a language much more effectively than the printed page does. Through devices such as color highlighting, graphics, motion, blinking, and pop-up windows, a well-designed computer program should direct attention to the most essential pieces of information, and guide learners more clearly to an understanding of the grammar. It should also allow them to peruse the grammar explanations and examples according to their own interests, aptitudes and desires. Well-designed search procedures of hypertext links should make it extremely easy to find any appropriate section in the entire program immediately, for consultation whenever necessary. Indeed, using a "hypertext" mode,
students should be able to explore the grammar almost totally freely, if they wish. Although many will wince at the potential chaos that might cause, I will make some observations later about the positive effects of encouraging such freedom of exploration, and how it might initiate a totally different paradigm for foreign language learning.

2) An "electronic textbook" should provide copious opportunities for interactive practice of the structures being learned. Unfortunately, computerized exercises provided by many publishers as "supplementary software" for their textbooks often simply duplicate those contained in the book, and just as with audio exercises in the language lab, the learner usually must proceed through the items sequentially. Further, these text-based exercises on the computer operate separately from aural-based exercises in the audio lab. An "electronic textbook" should eliminate this separation by playing audio exercises, stored digitally on magnetic disc, CD-ROM or even videodisc, as it displays them on the computer. Randomizing procedures within the computer program should insure that items in exercises are presented in a different order each time. Not only would this make practice with the language more interesting to students, it would also better prepare them for the unexpected, jumbled nature of actual language use. For this reason, I would advocate diversifying as much as possible within a given exercise the way students encounter the practice items, something which is very simple to achieve in an "electronic textbook," but nearly impossible to accomplish in a printed textbook.

3) An "electronic textbook" should keep track of the number of mistakes students make as they work with exercises, and recommend or require further practice, if necessary. This would individualize the work of the students according to their specific aptitudes, and show them when they have mastered the structures they are practicing. Further, an "electronic textbook" should include a review feature, which allows students to go back over a selected range of units to check and reinforce their grasp of the grammar and vocabulary contained therein.

4) The next step would be to test them on their mastery, and an "electronic textbook" should take over this function as well. Although computerized testing is easiest to program in a multiple-choice format, I believe that we should require more from students than simply responding with 'a,' 'b,' 'c,' or 'd' to something they see on the screen. For example, because of the capability of the computer to integrate text, sound and images, we should be able to devise more comprehensive items which test their ability to respond to visual and aural stimuli. In fact, the computer program would not necessarily have to evaluate their answers at all, but rather simply store them on disk for later review by the instructor. Thus
one could include items which call for totally free-form responses.

5) Alternatively, the program might administer diagnostic tests to determine the weaknesses and strengths of individual learners, and recommend activities to help them improve their skills in weak areas, or place them at an appropriate point in the language acquisition continuum. It should also provide means through which the teacher can make up tests for particular units, by selecting from a bank of text items and creating a test which can either be taken at and scored by the computer, or be printed out and given to the class in the traditional way.

6) An "electronic textbook" should help students learn the vocabulary of the foreign language. Because of their randomizing capability, computers have proven to be extremely adept at drilling vocabulary items, much better for students than learning their vocabulary from lists on the printed page. As much as possible, however, vocabulary instruction and practice should take place through presentation of graphic images or of words and phrases in context, rather than through traditional "flashcard" techniques in which students simply translate from one language into the other. Programs should move beyond simple one-to-one matching and develop ways to strengthen students' abilities to use individual vocabulary items within the broader context of the language. Here also numerous possibilities for "hypertext" techniques exist, allowing students to explore the lexicon of a language as extensively as they wish. I would also suggest that the program provide them with the means to save in a personal list the vocabulary items they particularly want to learn, and to practice these in randomly generated exercises.

7) An "electronic textbook" should include extensive passages for development of reading comprehension. The computer program should help students understand these passages by providing instantly accessible aids to comprehension, such as glosses on words and expressions, links to explanations of grammatical structures, graphics and images which illustrate the content of the passage, etc. It should provide pre- and post-reading activities, similar to those generally found in today's textbooks, and require or simply enable students to respond to these activities in some manner. For example, the program might present questions about the topic, to which the students would type answers, which could be saved in a file for later perusal by the instructor.

8) This leads to a further consideration, that of the role computers can play in developing students' writing skills in a foreign language. An "electronic textbook" should either contain its own word processing module, or even better, provide the means to "shell out" to a
commercial word processor with foreign language capabilities, so that students can write compositions with the aid of the computer. Programs like "Systéme-D," which make grammatical and lexical assistance instantly available to the user, would supplement such an "electronic textbook" beautifully, and students working at the computer should be able to switch quickly from the writing assignment in the instructional program to such external writing tools. Compositions could then be submitted to the instructor. This would lead to "interactive writing" activities, in which the students and the instructor work together in revising particular writing examples and improving the writing skills of each class member through mutual critiques.

9) finally, an "electronic textbook" should provide episodes of meaningful interaction in the language. The computer might present the student with a situation and ask for instructions on what to do. Such an activity could follow the format of an adventure game, and react in logical ways to a limited number of possible instructions. For example, in a restaurant scenario, it could show the student a menu, and then take his or her order, perhaps even making recommendations along the way or expressing regret when certain items are no longer available. In this mode, the computer should no just present such a situation textually, but also let students hear the questions and responses and show them the environment in which such a conversation occurs.

As I mentioned earlier, one of the major disadvantages of printed textbooks is that they cannot be changed quickly to adapt to new situations in countries where the foreign language is spoken. With an "electronic textbook," however, it would be relatively easy to publish revisions. This could be accomplished in several ways. A publisher might send out a floppy disc containing new materials, along with a program to install them into the original program. Or the publisher could post revisions on an electronic bulletin board for downloading by registered users. Such revisions could modify or replace almost any component of the program, including reading passages, vocabulary, pictures, sound segments, and learning activities. In fact, the publisher could even make it possible for instructors to upload items they have created, and thus make them available to other users of the program.

These are just a few suggestions which came to mind as I considered the potential capabilities of an "electronic textbook." Perhaps the most surprising thing about them is that none of these features is really absolutely new. Most are already offered by discrete programs which perform one or more of the functions described above, and all are well within the realm of possibility for present-day computers. The key to creating the "electronic textbook" is to integrate them into a coherent and
comprehensive system, which utilizes the computer as the nucleus for the beginning language curriculum. The printed textbook would still serve a function, but a greatly reduced one, in the learning process. It would become simply one of many parts, not the central part, as is presently the case. I envision it serving primarily as an instruction manual or guidebook on how to use the "electronic textbook," along with perhaps a basic overview of the grammatical topics or the general structure of the program.

I hope that my proposals have convinced you of the advantages of an "electronic textbook" over a traditional printed textbook. However, the question now arises of what problems might be associated with its implementation, and how these problems might be overcome. Let me address just a couple of them.

1) Clearly, publishing companies are not going to support the development and marketing of an "electronic textbook" if they cannot be reasonably certain of making a profit on it. Unfortunately, computer programs are notoriously easy to copy and distribute illegally, so an "electronic textbook" incurs the risk that students or instructors will use pirated copies. On the other hand, the size and complexity of such a program will require that it be stored on high capacity storage devices, such as hard disks or even optical disks, and thus it could not be copied easily for unauthorized distribution, at least not in its entirety. I propose that new distribution channels be created to correspond to the special circumstances of an "electronic textbook." In my view, it should probably not even be sold directly to students, but rather licensed to education institutions, at a price based upon the number of students enrolled in the classes it serves. Then the institutions could charge students a prorated fee for their use of the materials, and even be authorized to make copies of certain parts of the program for students to use at home. Such new arrangements between publishers and educational institutions would hopefully circumvent the problems of unauthorized distribution of the program.

2) The lack of suitable computer and video equipment at educational institutions could present a formidable hindrance to widespread adoption of an "electronic textbook." On the other hand, its very availability, and the excitement engendered by such a radically new mode of delivering foreign language instruction might encourage colleges and universities to make the investment in the equipment needed to take advantage of it. There are also various ways in which the publishers could help foreign language departments adopt such a program. For example, it should be made available in both MacIntosh and IBM versions, so that institutions which have standardized on either platform could use it.
Further, it should be constructed in modules which can be added to each other according to the selection of equipment available. The basic module should run on a computer alone, and audio and video modules should be offered as "options" which would be purchased by those who have the equipment to employ them. Finally, the publishers might make arrangements with producers of computer, audio and video equipment manufacturers to supply an appropriate hardware package at a moderate price.

The "electronic textbook" could radically change the way foreign languages are taught and learned at educational institutions. In fact, I believe that it could create a new paradigm for language study, one that relies more upon student initiative and freedom of exploration, and less upon teacher-controlled activities. As I mentioned earlier, many foreign language teachers might be apprehensive that this new mode of learning might lead to chaos in the classroom, or even completely eliminate the need for a classroom instructor. But let me point out some positive aspects of such a new approach.

1) with introduction of the "electronic textbook," the teacher will be freed to carry out more communicative activities in the classroom, rather than being tied to explaining grammar or drilling structures. Neither the computer nor any other piece of machinery will ever be able to duplicate the live and lively interchange which can take place between teacher and students in the foreign language class. real communication in the foreign language will always remain within the domain of direct teacher-student interaction in the classroom. Not only should activities involving free communication take place there, but with an "electronic textbook," class periods could probably consist exclusively of such interaction. The most important goal of the teacher's personal work with students would thus become the development and testing of oral skills. Other skills and activities could be left primarily to the "electronic textbook."

2) By offering such a rich variety of audio and video materials and activities, an "electronic textbook" could support classroom instructors much more strongly than any printed textbook can. For example, with suitable computer or video projectors in the classroom, they could show pictures, graphics, or even motion video segments from an "electronic textbook," and integrate them into their instructional activities. At the College of William and Mary, we are in the process of installing a new video distribution system which will enable us to accomplish that easily. This system will make it possible for instructors in the classrooms to control the operation of computer programs or the presentation of video programs on equipment located at a central distribution point. We are very excited about the ways this system
will help us in our foreign language teaching, even without the presence of "electronic textbooks." At institutions without such a system, computer and video equipment would be required for each room, but many schools do have "electronic classrooms" containing configurations of such equipment. Utilization of materials from an "electronic textbook" would quickly demonstrate the value of these classrooms.

3) The freedom of exploration conferred upon language learners by an "electronic textbook" would have a positive effect on the affective nature of their learning as well. Because students could easily pursue paths of inquiry which interest them, rather than having to follow the progression of the textbook, they would become much more enthusiastic about their study of a language. One of the most popular kinds of exploration might be that of finding new words for conversations or compositions in the language. I have found that from the very outset of their study of German, many of my students try to stretch their capacity to express themselves, to use more words and expressions than the textbook has furnished them up until then. With an "electronic textbook," they could find such new words quickly, and even learn structures in which they appear.

4) Finally, the randomness and unpredictability of stimuli resulting from a hypermedia mode of exploration could simulate the way we encounter reality in foreign countries, and thus better prepare students for experiences there. On the other hand, such diverseness could easily leave the beginning language learner in total confusion, groping aimlessly through a jungle of unknown flora and fauna. Therefore, in creating an "electronic textbook," we must still be careful to impart a clear organization to the materials, to devise a plan which students can follow as they desire or as the progress of a course requires. The trick will be to strike the proper balance between systematization and randomness, between constraints and liberty, between the need to learn the structure of a language and the desire to express oneself freely and comprehensively in it. In my view, the greatest power of an "electronic textbook" could lie precisely in offering foreign language learners the opportunity to exercise either option, that is, to learn a language systematically or non-systematically, according to their own needs and learning styles.

CALICO can play a crucial role in the development of "electronic textbooks" for foreign languages. No other organization brings together the depth of talent and know-how in both foreign language teaching and technology that this one does. So I would like to close with a challenge to all of us to work together in designing and implementing such projects, so that we can demonstrate conclusively what we have suspected and hoped all along—that computer, coupled with other advanced technology, can
revolutionize the way we teach and learn foreign languages.

Addendum: I encourage responses to these proposals from readers and from publishers, and I hope that the publication of this talk will initiate an interchange of views and practical suggestions in the CALICO Journal on the desirability and feasibility of adopting such a new vehicle for foreign language learning.

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