

CAN TECHNOLOGY FULFILL ITS PROMISE?

Keynote Address from The Second International Conference on Foreign Language Education and Technology 1992, Chubu University, Japan

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What is the promise of technology in foreign and second language education? The simple answer is that no one really knows. Nevertheless, science-fiction writers have long envisioned a day when tiny, immensely powerful computers presumably combining artificial intelligence with sophisticated voice recognition and synthesis capabilities will do all our translating and interpreting for us; they might even render foreign language teaching as we know it unnecessary. Already, several versions of the linguistic counterpart to the pocket calculator have reached the market; but they are as yet little more than novelties. It will likely be many years before such devices advance to the level of being valuable linguistic tools. Meanwhile, foreign language educators are concerned with making the most of the obvious potential of technology to help students learn foreign languages. A number of concerns should guide us, such as the following.

1. Are we making the right demands on technology?
2. Are we asking the right questions about technology?
3. Are we prepared to interact effectively with technology?

1. Are We Making the Right Demands on Technology?

Let me offer three broad categories I see of technological applications to foreign language teaching, my own "three M's": Management, Materials, and Methods.

1.1 Management

In the first place, computers and related technology have brought to education what they have brought to business: management of information and services. I am not talking here simply about the obvious administrative, grading, and record-keeping functions to which computers are ideally suited (and for which they are already so widely used). Rather, I am referring to using technology to provide distributed, cost-effective access to knowledge and instruction.

"Distance education," for example, is one phrase that we are hearing more and

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more. Often we think of distance education (also called "distributed education") in connection with places like the outback of Australia or the rural areas of other large countries like Canada, China, Russia, and the United States. But even in smaller countries with large and densely concentrated populations like Japan and Western Europe, it is my feeling that distributed education will take on new importance as governments find it increasingly difficult to build enough schools and classrooms to provide education in the traditional teacher-directed mode.

I can remember, for example, as a beginning university student in 1961, large lecture classes in subjects like psychology and zoology, where three times a week hundreds (in the case of the psychology class, it was over 1,500) of other students and I would go to a large auditorium to watch and listen from afar as a professor, many meters away, would lecture from a raised platform. We could barely see him, and of course there was no opportunity for asking questions. Questioning, fundamental to American education, was limited to once a week, when the students met in smaller groups for laboratory or discussion sessions led by the professor's assistants.

The following year I found myself in a chemistry class with hundreds, perhaps thousands, of other students. The reason I do not know the number is that this lecture was delivered via television. It was no more interactive than the presentations made live in the huge lecture hall, but it did offer two distinct advantages over them. First, *every student had a front-row seat*. One could be as close to the lecturer as necessary, and when he did an experiment—pouring one solution into another, and waiting for the color of the mixture to change, for example—the camera focused in on the beaker where the reaction was taking place. It was as if we were right at the demonstration table with the lecturer.

The second big advantage the television chemistry course had over the zoology and psychology lectures I had taken the year before was *repeatability*. The chemistry lectures were shown many times, in many locations, each week. Problems related to illness, transportation, scheduling conflicts, and even the momentary lapses of attention that are typical of young university students were eliminated, for we could see any lecture as many times as we needed to, whenever we needed to, in order to get the information. (There is a parallel today as we watch the Olympics: in many ways television coverage gives one a better sense of the events than being there in person!) And, like the psychology and zoology courses, the chemistry lectures were augmented once a week by small-group laboratories in which students could ask questions.

During the 1970s and 1980s much was written in the United States (and perhaps elsewhere) about the negative elements of such mass educational settings. But my personal experience was not negative; the chemistry course, in particular, was very well done. There was one drawback to it and the others, however: all the students had to go to the campus of the university to receive the instruction.

Imagine how that televised chemistry course can be enhanced with today's technology: the same lectures can be beamed in full color (augmented where appropriate by split screens and animation) not only to campus locations but also to homes. After (or even while) watching the lectures (which can, of course, be videotaped at home by the students for later viewing if the broadcast conflicts with the student's schedule), students can use electronic mail from home to ask questions, do exercises, and take tests. Using these same home computers as terminals to access a file server controlling an interactive CD video program at the university, students can do simulations of

experiments, mixing precise amounts of chemicals under perfectly controlled conditions of time and temperature to bring about reactions, with no danger to themselves or others if things go wrong and the solutions explode.

It is this kind of management of instruction that the technological era has made possible. We can now provide not only enhancements of existing instruction, but also deliver instruction in places, on subjects, at times, and under conditions where no instruction was possible before. For us in foreign language, it means that with imagination we can provide cost-effective instruction in low-enrollment languages, including the low-enrollment upper-level language classes, to students wherever they might be.

1.2 Materials

Technology is providing enriched, authentic, and multi-sensory input. Native speakers of the target language, using that language in contemporary, authentic settings in their daily lives, are accessible to anyone with a satellite dish.

Setting aside for a moment the very useful, but comparatively low-level applications (such as electronic flashcards, dictionaries, and grammar reference programs), computer software already developed can provide on-line readers: when you come to a word you do not know, you can highlight and double-click it with your mouse. Instantly an explanation—in the native language or the target language—can appear on your screen. If linked via hypermedia to other material stored on a CD, any word or concept can be further illustrated with maps, paintings, photographs, music, text, and action. This technology is already present; I am sure many of you have seen demonstrations of it. Not yet in widespread use in America, it is

becoming steadily cheaper and more sophisticated, and its appearance as a standard feature in language and other classrooms is only a matter of time.

1.3 Methods

Technology can provide learner-centered, individualized presentation and practice: it is good for input and for evaluating controlled output. Its many advantages over the textbook or other traditional means of teacher-managed instruction have been cited elsewhere and are well known, and include some of the following features.

Learner control

Self-paced. The student can take as long as she or he needs to do a lesson. His or her rate of progress need not be determined by a schedule set by a teacher or by other students in the class.

Not linear. With flexibly designed computer programs and CD technology, the student or the program can access any portion of the materials at any time. (This is an advantage shared with the textbook; but audio- and videotape media lack this flexibility.)

Availability

'Round-the-clock, 'round the world. With proper distribution of the software or proper access to equipment and networks, the student can access the materials when, where, and for as long as she or he needs to.

Tireless. The computer, CD, or videotape machine will play, re-play, and play again any program or portion of a program that the student wants to view or work with, as often as needed. It will never get tired; it will never get angry; it will never get sick.

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Enhancements

The range of input that technology can provide compared to what the teacher, textbook, and slide projector audiotapes of just a few years ago could provide is astounding. (I find myself, in my native language, constantly referring to my on-line dictionary/thesaurus program. I have done so many times in preparing this paper. I still have a paper dictionary and thesaurus on my desk, but I find myself referring to the electronic versions first, simply because it is easier and faster.) To be sure, we are still unable to deliver touch, taste, and smell electronically; but perhaps we need to leave something for a visit to the target country. In sum, in terms of management, materials and methods of foreign language instruction, it appears to me that we are indeed making the right demands on technology for the time being, and that technology is largely capable of meeting our presently perceived needs. But what of the future?

2. Are We Asking the Right Questions about Technology?

Many questions arise when a teacher, professor, school principal, or college dean looks at technology. We will continue to want reasonable cost, user-friendliness, and reliability. We will want machines that are compatible regardless of the particular manufacturer, and we want them to be expandable, upgradable, and upwardly compatible. All of these are good points, but the main question is: what will any new technology do better than the existing alternative?

It is not clear to me that this question is answerable in full. That is, when we seek technological solutions, we usually have a reasonable understanding of the problem and of the capacities of the technology. But do we have either in this instance? I think not. Technology, as we have seen, is in a

constant state of evolution: just two or three weeks ago Sony announced development of a blue laser, which will triple the amount of storage capacity available on a compact disk. That could easily render present CDs and CD technology obsolete, just as it is getting started. Who knows where the next technological breakthrough will come, what it will make possible, and what it will render obsolete? How can one seek to apply existing technology to a problem, knowing that no matter what platform one decides to work on, it is almost sure that some new technology will soon pass it by?

Perhaps the best solution is not, therefore, to look at technology for our solutions, but to examine our needs.

As we look at needs, however, there is a presupposition that we understand the problem. Alas, with language learning, I fear such is not the case. That is, while nearly everyone is monumentally successful at first language acquisition in childhood (a process we clearly do not understand), only a tiny percentage of the world's population has been even modestly successful at second language learning as adults. If we understood the reasons for that lack of success, we might have a clearer understanding of where we could apply technology to help the process along. But we do not.

Thus, since we really do not understand the problem to which we want to apply the technology, and since the evolution of the technology is constantly rendering developmental work obsolete even as it is begun, what are we to do? My answer: we must seek to enumerate principles, not particulars, which our applications of technology to language teaching must observe.

3. Are We Prepared to Interact Effectively with Technology?

It is clear that technology offers much to enhance our delivery of instruction, however imperfectly we understand the learning process and however surely any technological platform of today is likely to be outmoded tomorrow. That is a limitation, but a limitation is not necessarily a liability, however: the invention of the screwdriver did not render the hammer obsolete—we still use them both. They serve essentially the same purpose, but each is used under the conditions and for the purposes to which it is best suited. The lesson for us, then, is to come to an understanding of the conditions under which a given technological development is best applied to (in our case) foreign language teaching and learning. There are and always will be settings in which one technology is more or less effective than another, or than a live teacher would be.

Therefore, without even trying to answer the key question facing us (“What will a new technology do better than the present alternative?”), let me return to the issue of principles, offering seven that I think we should keep in mind as we evaluate any technological approach to instruction.

3.1 *Technology Should be an Investment, not a Cost*

In business parlance, “costs” are obligations, burdens that must be borne however unwillingly; they represent a sacrifice necessary to achieve the ultimate goal. They are concrete, straightforward, easily estimated and controlled.

By contrast, “investments” are far less clearly defined. They are usually voluntarily embraced. They represent enthusiasm for the undertaking, confidence in the future, and hope for a certain kind of outcome. Both costs and investments often are

ongoing, but investments are supposed to have an ultimate positive payoff if the investment plan is maintained. Investments are not a sure thing, however; there is risk involved.

When considering a technological enhancement or innovation in our teaching, we ourselves should remember, and remind others (administrators, colleagues, parents, students, taxpayers, etc.) that technology is an investment. At least at present, it appears to me that any major commitment to technology in language instruction bears both the risks and the potential rewards associated with investments in any other aspect of life.

3.2 *Technology Should Fulfill Needs, not Create Them*

Technology will do both. That is, if a school puts up a satellite dish or installs a computer laboratory, it will thereby create for itself a need for expensive equipment maintenance, for example, where there might have been none (or far less of one) before. There is no getting around this.

But I am speaking here programmatically, not simply administratively. Consider the example of an American college that installed a satellite dish. The top administrator of the college was very proud of the dish, and ensured that it was featured in alumni publications and the local newspaper. It was not too long, however, before the initial enthusiasm changed to disenchantment: no one knew what to do with the expanded television reception capacity that the dish had enabled.

That dish still is not being used effectively, for little thought was given to the additional needs that would be created by the installation of the dish. No one, for example, allowed time and money for faculty to learn how to use the downlinked

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programs effectively in their classes. Additional television monitors, which presumably would be needed if downlinked programming were to become an integral part of the curriculum, were not budgeted for. Time for television viewing as "lab work" was not built into the curriculum planning of the institution.

Technology surely can fulfill needs, as we have all seen; it will also create others that had not existed before. Technological innovators and implementors must carefully weigh the balance between fulfillment of existing needs and creation of new ones.

3.3 Technology Should Enhance the Curriculum, not Dictate it

There is a very real danger that once an investment has been made in technology, there will be considerable pressure to make it "pay off." But such a payoff will not occur if, shortly after the technology has been put in place, it is rendered obsolete by some new hardware or software package. Such is the two-edged sword of technology.

I know of an institution, for example, where much time and money were expended to make a major commitment to a particular curricular revision. Once the revision and its attendant development had been completed, another substantial expense was incurred implementing it. Unfortunately, no one seemed to give much thought to what might happen if subsequent changes needed to be made; e.g., if the materials in use at the time of the curricular revision should become obsolete, which in fact is what happened.

When the materials became obsolete, the institution was very slow to abandon them and implement new materials and procedures, due to its considerable investment made just a few years earlier. Thus, what had begun as a major and laudable

demonstration of the institution's flexibility and willingness to examine its curriculum and its students' needs, then became something of a straitjacket, inhibiting further development and revision.

3.4 Technology Should Augment Live Instruction, not Replace it

While there are many things we do not know about adult second language learning, one thing it seems to have in common with child first language acquisition is a fundamental reliance on live interaction with proficient speakers of the target language. Technology, at least as we presently know it, cannot provide this live interaction: only a human teacher can respond sensibly and meaningfully to unanticipated student statements, clarify student questions, sort out classroom confusion, and so on.

An institution I visited spent hundreds of thousands of dollars to install interactive videodisc equipment, and then allocated thousands of hours of instructor time to develop courseware to be used on the equipment and to do the programming necessary to allow the students to have some measure of control over the courseware. The result was truly admirable: students could sit down at an interactive video position and work with a videodisc, for example, starting and stopping it at will, replaying portions of it, and asking for various levels of help (such as on-screen transcriptions and even translations of what was being said by the actors). Additionally, at various times the computer controlling the videodisc was programmed to freeze the action and flash a question on the screen for the student to answer. If the student answered the question correctly, the program went forward; if the student answered the question incorrectly, the program branched back to the portion of the video where the correct information had

been presented, and then offered the student the chance to answer the question again.

This installation was ideal, as you might imagine, for out-of-class homework assignments, allowing students to work through the materials individually, at their own pace, starting here and stopping there to give extra time and attention to things that were unclear to them. When the students came to class, the teacher would then be able to engage them in live, communicative target language conversation about what they had seen and heard.

But what, in fact, did the institution do? Rather than giving students assignments to be completed outside of class and then built upon in class, students were taken in class groups, during class time, to the videodisc lab to work through the materials. All students would work on the same lesson for about the same amount of time. Some would finish early, but others would not be finished at all. Worse yet, the teacher's "teaching" function during these lab periods was simply wasted: she or he would idly, for the most part, watch the students work through the materials, then collect the videodiscs, turn them in, and escort the students back to their classroom in time for dismissal.

I am convinced there was a good way to make effective use of the videodisc lab and courseware available at this institution, but what I saw happening was not an example of it.

3.5 Technology Should Increase the Quality of Foreign Language Study, not Merely Accelerate it

A technological enhancement should enhance the effectiveness of the time students spend in language instruction. This does not necessarily mean an increase in clock hours of the school day devoted to language instruction, but could in fact take

the form of more productive use of the time already allocated for language instruction. To build upon the previous example, for instance, if the institution had sent *half* of a class at a time to the videodisc lab so that the teacher could spend his or her time working in a live, interactive, communicative format with the other half of the class, both halves of the class would likely have made better use of their allocated foreign language classtime.

As language educators, we should resist any suggestion that the reason to implement technology is to decrease the amount of time students will have to spend in language study. At the very least, a technological enhancement to our instruction should make the hours invested in language learning more productive than before. Assuming that increases in "learning productivity" can be achieved in a technological setting (or in combination with such a technological setting, as in the example I have given), we should then seek to build upon that increase by raising the achievement goals set for our students.

That is, technology can be a time-saver in many ways. But for the most part, its use should not be regarded as a way to decrease the amount of time students need to spend in learning activities. Rather, any time "saved" should be re-invested in higher-quality learning activities. Language learning in most school settings is not as productive as we would like it to be; we should be implementing technology to improve learning, not to achieve current levels of mediocrity more quickly.

3.6 Technology Should Inspire Users, not Intimidate Them

The "users" of technology are both the students and their teachers. In the past two or three years we have seen a major advance in the user-friendliness of technology. It

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seems to happen over and over again, whether we are talking about automobiles, stereo equipment, or computers: initially the machinery is intimidating, requiring that those who want to interact with it develop specialized knowledge about the equipment and its operation. In this development stage a "priesthood" of users can develop and become a class unto themselves; others may join the "priesthood" only if they are willing to learn the jargon of the new technology and adapt themselves to the *modus operandi* of the specialists who have preceded them. Some people, we can be thankful, do precisely that and among those who do there are inevitably individuals who see ways that the technology can be of benefit to a wider audience. Gradually these enhancements are made, and as this happens, the widening circle of users begins to include those with the imagination to use the technology in still other ways that its developers and earlier users had not thought of.

This process, the constant popularization of technology, can work at several levels. It is quite possible that a non-specialist may visualize a role for a given technology that a specialist had not considered. Specialists might then be able to take that idea and find ways for the technology to serve that need. Even if the limitations of a current technology are such that the enhancement cannot be made, the idea has surfaced; it may be that a subsequent generation of the technology will incorporate the capacities needed to allow it to perform the function that was envisioned for, or inspired by, its predecessor. The point is to ensure that the users be able to master the "how to use it" aspects of the new technology easily, so their minds can be free to develop creative new uses for the technology.

3.7 *Technology Should Liberate Users, not Enslave Them*

Ultimately, what we want from technology is that it allow us to exploit our unique human capabilities for interaction with other human beings (our students). Teachers should not become so enthralled with technology that we forget what our role is, any more than a librarian should become so wrapped up in keeping track of books on shelves that she or he prevents students from accessing and acquiring the knowledge contained in those books.

Any technology (or any administrative structure controlling the use of the technology) that requires that the teacher adhere rigidly to input/output protocols, or limits students to certain kinds of interaction while preventing others that might be just as beneficial (if not more so) to language acquisition, should be opposed in principle.

4. **What, Then, Is Our Role as Teachers, Not Technology Specialists?**

By now you have probably realized that I see a bright future for technology in foreign language teaching, even if I do not pretend to be able to forecast the particulars of what that technology will be. Whatever it is, however, the teacher's role is going to increase, not decrease, if we are sensible. No one has put it better, I think, than Ray Clifford, Provost of the Defense Language Institute and President-Elect of the American Council on the Teaching of Foreign Languages, who has said, "It is my conviction that computers will not replace teachers. It is also my conviction that teachers who use computers will replace teachers who do not use them.... The major question is not *whether* computers will be used; it is *how* computers will be used."

What role do we, the teachers who are knowledgeable about computers and

technology in general, without being technology specialists, have to play in the future? I see three.

4.1 We Must Be Evaluators

We must be the ones who stay abreast of technological developments in order to consider their possible application to teaching. This does not mean we must constantly read the specialized trade journals; we should, however, be alert to major product announcements in the popular media, such as the development of the blue laser by Sony.

We should also constantly evaluate existing and available materials and technologies so that we know what we like and do not like. Using this information, we should evaluate new materials and technologies to see if they meet our criteria, or if they might cause us to revise our criteria—which we must remain willing to do.

If we do not do these things, we run the risk of having a new technology surprise us, and of having an application of that technology developed and sold to us (or to our administrators) in such a way that it runs counter to what we know or believe to be effective in second language teaching.

4.2 We Must Be Implementors

Once we have evaluated and accepted a technology, we cannot sit back and wait for someone to hand us a turn-key system. We should be involved in how that technology is adapted to our teaching situation. We must be prepared to tell hardware developers, software companies, curriculum specialists, and courseware publishers what we need, what we like, and what we do not want. In my experience, the private sector will listen to us. Indeed, they are eager to hear from us, for they cannot afford to squander the immense sums for development and

marketing associated with the introduction of a new product.

Moreover, once a new technology has been developed, we are the ones who must push that technology to its limits. We must do so for two reasons: first, any new technology is likely to be expensive. We owe it to our students and their parents to get the most we possibly can out of the money we ask them to spend. Second, it is only by constantly pushing and demanding more of the technology that we will be able to discover its limits; and it is those discoveries that will set the stage for further refinements of the technology, or for the development of new technologies.

4.3 We Must Be Communicators

We must be prepared to explain, demonstrate, and answer questions about the technologies that we are using (or would like to use) and those that we are *not* using, when dealing with potentially very skeptical, or at least unenlightened audiences.

Let us recognize in the first instance that most adults, be they parents, institutional administrators, or our colleagues, are failed foreign language learners. While most adults who tried two or three years of music lessons do not regret the experience (they may even wish they had continued longer), many of those same adults harbor unpleasant memories of their foreign language study. In part, we—the foreign language teachers—are to blame for that; let us resolve to try to ensure that every student's encounter with foreign language study, however brief it may be, ends on a positive note.

Secondly, at least in America, most school principals and college deans are men; these are the administrators who control the budgets. American men like electronic gadgets and sports. Foreign language programs are not generally associated with sports, but

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they are clearly—ever since the days of the tape recorder and the language lab—closely associated with electronic gadgets. With satellite downlinks, computer-assisted interactive video, and electronic format analyzers to help students develop native-like pronunciation (to name but a few current technologies) becoming more and more common, “gadgetmania” can easily be perceived to offer magical answers to problems for which we have failed to provide sound pedagogical solutions.

Given the body of persons with whom we must deal, we must inform ourselves of the pros and cons, the promises and constraints, of technological applications to foreign language teaching. Even if we cannot instantly discuss in detail the particulars of a given technology, we must stay informed of the currently-accepted principles of language learning and of the uses of technology in education, and be willing to share what we know and believe with others at forums like this. In that connection, I thank you for your kind attention and for inviting me to this conference, for it has given me an opportunity to learn more about the prospects and limitations of employing technology in foreign language teaching.

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