The Role of Instructional Technology in Foreign Language Teaching:

State of the Art and Future Directions

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Introduction

Appreciating the impact of technology on education, and predicting its future course is a challenging task. It is, however, one which we as foreign language specialists have a professional obligation to undertake. As an organization, IALLT itself is of course quite aware of this challenge and has on several occasions sought to assess the state of current instructional technology and chart its future directions. The most recent example of this is to be found in the chapter of the Language Center Design Kit (Fourth Edition) devoted to the future of language centers. As Andrew Ross, the author of that module, points out with some wit, peering into the future of instructional technology is somewhat akin to haruspexy, i.e., reading of the entrails of animals. Notwithstanding, as Andrew's overview demonstrates, at least as far as language centers are concerned we've done pretty well at figuring out where we are and where we're heading. However, our success in reading technological entrails contrasts markedly with the track record of those trying to glimpse a broader view of the future of educational technology.

History is littered with the unfulfilled promises of instructional technology. From Thomas Edison at the beginning of the twentieth century to B. F. Skinner at the end of the 1960s, each new technological innovation (audio recording, motion pictures, radio, television, language labs, teaching machines) has been heralded for the revolutionary effect it would have upon education. A classic example of just how wrong such predictions can be is the Time Magazine article devoted to the 1978 Man of the Year: The Computer. As confidently, and undeterred, as any previous technological prognosticator, the author of the article boldly proclaims:

> Across the country, these 'magical beasts' as they have been called, are assisting hassled, often incompetent, teachers. They are revivifying soporific students, dangling and delivering challenges beyond the ken of most educators....
> The computers provide an intensely visual, multisensory learning experience that can take a youngster in a matter of a few months to a level he might never reach in less than many, many years of study by conventional methods.
> (Time Magazine, February 20, 1978)

Despite all the hype, even the most enthusiastic proponents of instructional technology would not claim, in fact cannot claim, that computer-based technology has revolutionized education the way that has so often been predicted. But then, we need to remember that previous truly revolutionary innovations, notably the invention of writing and print technology, took centuries to have any real impact on education. So, too, until only very recently—in fact only within the past three or four years—the hardware and software resources available for educational exploitation were really quite limited. With respect to foreign language teaching in particular, it has only been through the dedication and determination of a relatively small number of "early adopters" that CALL (Computer-Assisted Language Learning) has advanced as far as it has.

So, if computers are not going to magically transform education, if they are not going to speed up the learning of students (soporific or otherwise) by 50% and reduce delivery costs by 30% (or whatever), let alone completely replace teachers (hassled, incompetent or otherwise), what then is the role of instructional technology in foreign language teaching? What is the current state of the art? And what effect will this have on the future of language centers? To answer these questions, we need to look at the convergence of three major influences –technological, pedagogical, and theoretical - that have been operating over the last five years or so.

State of the Art

Technology

Desktop computer technology has improved exponentially since the appearance of the first microcomputers twenty years ago. So much so that the term "Moore's Law" has been coined to describe the doubling of computer power every eighteen months: faster CPUs, more memory, bigger hard disks, etc. Of particular importance for foreign language teaching, are the most recent improvements in operating systems on both the PC (Windows XP) and Mac (OSX) platforms. Most notably, the adoption of Unicode character encoding

has made it possible to access the writing system of any language in the world directly from within the resources of the operating system itself. This, of course, has obvious implications for application to less commonly taught languages, which very frequently do not use Western European alphabets. Whatever can be done in English or French or Spanish is now equally possible in Arabic, Japanese, Hindi, etc., without the need for special language kits or foreign versions of operating systems.

Current operating systems also allow as never before the seamless integration of multimedia resources, which are so critical to creating the virtual reality needed to support foreign language acquisition. Ironically, as computers have become more powerful, they have also become more transparent, not just because of shrinking sizes but also because they are now very much more like home appliances. You turn them on, pop in a CD or a DVD, and (increasingly) the user doesn't have to deal with making things work. Connecting up external devices, installing operating software, initializing programs, resolving memory and port conflicts, etc. are not entirely things of the past, but we are getting very close.

Recent quantum advances in network hardware and software capabilities have similarly had a major impact on our ability to exploit computer technology for instructional purposes. The Internet in general, more recently Internet2, and especially the World Wide Web, have "brought the world into the classroom" or to be more accurate into the curriculum, in ways that were unimaginable even five years ago.

Language Pedagogy

As important as these technological improvements may be, they are not, however, what is motivating foreign language instructional technology today. On the contrary, the driving force behind current CALL is an ongoing paradigm shift in pedagogical methodology that began some 20 years ago. The first major changes in language pedagogy occurred back in the 1980s, as the profession abandoned behaviorist, structuralist, approaches to language teaching in favor of communicative methodologies. Since the end of the 1990s, while maintaining a strong commitment to communicative goals, foreign language instruction has been increasingly influenced by task-based and content-based methodologies.

Learning Theory

Current pedagogical approaches themselves derive from learner-centered theories emanating from cognitive psychology and second language acquisition research. These stress the constructivist nature of knowledge acquisition and the need to engage students in real (or at least realistic) situated learning. Vigotskian sociocognitive theories have added to the equation the imperative of meaningful interaction in authentic discourse communities. It is this combination of pedagogical methodology and learning theories which has been driving CALL for the past few years. Needless to say, although the pedagogical innovations under way in foreign language teaching today are motivated and justified quite independently of technology, they could not be realized without the support that computer-based technology now makes possible. But it must also be said that instructional technology itself has undergone substantial qualitative changes in recent years in response to the demands of pedagogical methodologies.

What has fundamentally changed about the role of technology in foreign language teaching since the end of the 1990s, is the great reduction in its use as a tutorial drillmaster and the equally great extent to which it has evolved into an indispensable facilitative tool for written composition (word processors, grammar/spell checkers, online dictionaries), for the pursuit of information gathering, archiving, and shared distribution and equally importantly, its use as a collaborative communication tool (group writing software, e-mail, synchronous/asynchronous discussion programs).

This then is the current state of the art in foreign language instructional technology and it, needless to say, will have a major influence upon the future directions of any language center, especially in regard to three critical parameters: technology, teaching practices and professional development.

Future Language Center Directions

Language Center Technology

As is very clear from the new edition of the Language Center Design Kit, any new lab installations that intend to fully exploit instructional technology are bound to be entirely digitally based. Audio cassettes have long given way to CDs or server-based recordings for audio lab programs. Labs that have retained analog cassette systems have for several years now been replacing them with software-based alternatives. Analog audio systems have quite simply become too obsolete to maintain and, to the extent that they continue to exist at all, this has only been possible by cannibalizing equipment or latching

on to bits and pieces from decommissioned labs elsewhere. Laser discs are dead. Centers that possess them have already started giving them away. DVD, either integrated into a computer or as a stand-alone player, has already completely replaced laser discs. And it's just a matter of time until the video cassette/VCR follow suit. These, however, will not disappear overnight, at least as far as teacher (as opposed to student) usage is concerned. Long-time teachers, in particular, typically have a considerable stock of "legacy" video (and audio) tape resources which they have built up over the years. And these analog resources will need to be supported (by a few inexpensive audio and/or video cassette players) until such time as they are eventually digitized (or the teachers retire).

The inevitable total digitization of language lab resources is bound to have a profound effect upon the operation of language centers. And we don't need a crystal ball to see what this is going to be. All we need to do is look back to what has been happening in recent years at well-established installations. Dartmouth College[1], for example, has been keeping track of student attendance at its language center at for some time, as represented in the following chart:

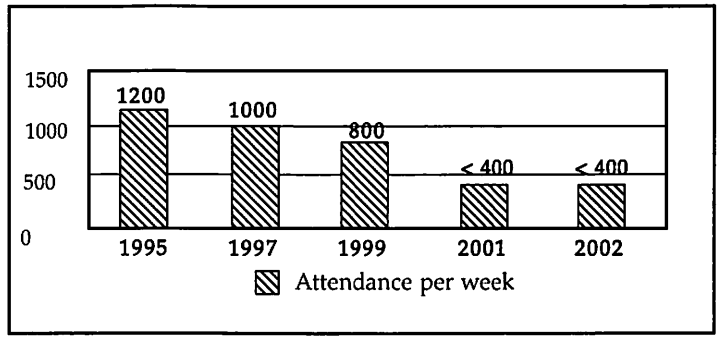

Figure 1: Lab Attendance

As can be seen, over the past seven years attendance at the center has decreased by more than two thirds. At first glance, it would appear that the Dartmouth language center is heading for extinction. In reality, use of its resources has never been greater. It is the means of accessing these resources which has radically changed, as the following chart makes clear:

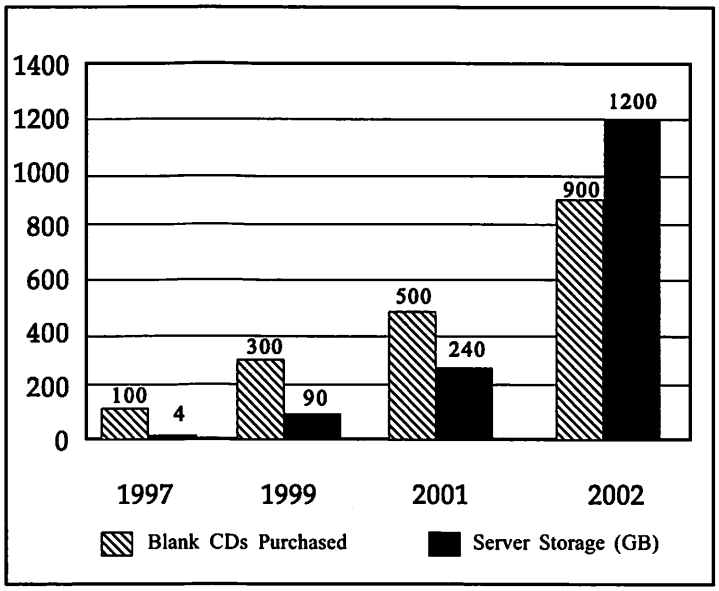

Figure 2: Media Storage

In the last five years, the use of server space (and to a lesser extent CDs) to store digital media for distribution has soared, and this because language center resources have increasingly been made available to students over the campus network. The reason so few students are coming to the center any more is simply because they no longer have to. They can do most of what they need to from other campus locations, including of course their dorms.

The one language center resource that campus networks are still struggling to deliver is full-screen video. However, the central storage and multiple distribution of video (and of course less demanding digital media) within a language center LAN (Local Area Network) is very much possible now. But such centralization of resources is not without its costs. It requires state-of-the-art network capability, special-purpose media servers, and up-to-date desktop computers, but it can be done. Is it really worth the expense, however? Why bother? And what does this have to do with the future operation of language resource centers?

Perhaps the most obvious advantage of the central digital storage and distribution of all media resources within a lab is that it completely eliminates the need to physically check out anything to students. Student access to resources is considerably enhanced because, in conjunction with a special type of network software, all server-based

resources can be made available on all computers in a LAN at all times. Under a keyserver controller, a type of software metering device, what matters is not the number of computers upon which software is installed, but rather the number of simultaneous users of a program. Simultaneous usage of applications is simply restricted to the number of valid licenses, so even single user licenses can be made available on any computer on the LAN. This is especially important to small enrollment courses which otherwise don't have student numbers to justify purchasing copies of software for a whole lab, the only alternative being to just install software on certain computers which may or may not happen to be available when they are needed. And because keyserver software automatically tracks usage, it is possible to know exactly when demand for an application exceeds supply and software licenses can be upgraded accordingly.

One last advantage of a totally server-based resource distribution system is its potential to provide a maximally flexible, maximally individualized, student working environment. By means of user profiles, linked to enrollment databases, it is possible to custom tailor the student's desktop to provide exactly what each student needs: language course materials, course links, foreign language fonts, input methods, etc. All a student needs to do is log in and the system takes care of the rest.

When we get to the next generation of campus networks, and that's really not so far off—in fact some state-of-the-art facilities are there already—language centers with experience managing centrally digitized resources will be able to immediately exploit the available bandwidth to become truly virtual environments. This scenario raises a very serious question about the future of the language resource center. When all its resources are finally available from anywhere on campus, what justification will there be for maintaining a center as a physical entity?

A number of critical needs require the maintenance of a center as a physical space. The most compelling of these is perhaps the need to support synchronous group-based work. This applies to teaching activities (e.g., real-time collaborative writing exercises, information retrieval and analysis, etc.) as well as for testing purposes (e.g., placement, formative and summative evaluation). The maintenance of a physical space is equally important in order to provide a tutorial environment, staffed by qualified lab assistants, in which instructors, no less than students, can learn to use the technological resources they will be increasingly called upon to employ as part of the foreign language curriculum. This includes not only whatever courseware is integrated into the language syllabus (e.g., chat programs, textbook

CDs, and websites, etc.), but also the hardware (scanners, writing tablets, digital still and video cameras, etc.) and facilitative software (e.g., multimedia and web editors, presentation managers, etc.) that are so much a part of current CALL. A strong case can be made as well to further exploit the tutorial potential of a center by engaging lab assistants with foreign-language competence (e.g., advanced level language majors or native foreign language speakers from other disciplines) to serve as informal tutors and conversation partners.

In becoming entirely digital and network-based, the resources of a modern language center will inevitably make increasing demands upon the computer equipment of students, which not all will be able to meet. Equitable access demands the presence of a place on campus to which students can come to use essential technological resources. To the extent that a center has as its mission to support the professional development of faculty, including graduate methodology or instructional technology courses, its physical presence will also be difficult to do without. Lastly, it is important not to fall into the trap of equating a modern language center with a mere computer lab. A language center is, or certainly should be, much more than a simple outlet for the distribution of digital resources. Language acquisition is an intrinsically social phenomenon and a very important function of a language center is that of fostering social interaction between faculty and students as well as between students themselves. Needless to say, this function is much more easily facilitated within a real as opposed to a virtual environment.

In sum, as long as there are teachers and students meeting in classes on campus, we're going to need a physical language center to meet their needs. Andrew Ross, in the Language Center Design Kit module referred to earlier, sums up very well the situation:

> The future of the language center will see not the demise of its physical body, but an expansion of its functions through its open layout, multiple uses, innovative direction linked to broader institutional goals, openness to technological and pedagogical change, and lastly, to its increasing use of the network to offer its services ... to those outside its confines.
> (A. Ross 2003: 88)

However great the coming changes to the technological base of language resource centers, they are arguably not what will be of primary importance to language teachers. Like familiar technological tools, such as a VCR, an audio cassette player, or a video projector, as long as the resources are there, and they work when they are

needed, language instructors don't really have to (and usually don't want to) know the technical details. What is of much greater relevance to faculty is knowing how instructional technology is likely to affect their teaching and professional development. Again, we don't need a crystal ball to predict what's going to happen. It's quite enough to observe what is already taking place at the cutting edge of the profession.

Teaching Practices

Without a doubt, the single greatest impact of instructional technology upon foreign language teaching (indeed teaching in any humanities discipline) is bound to be the extent to which it necessitates collaborative engagement. In presentation after presentation at the recent Consortium for Language Teaching and Learning conference (Philadelphia, October 2002), which not coincidentally was devoted to the theme of collaboration, colleagues reiterated the absolute necessity of working in concert to achieve pedagogical objectives. And this extends across all phases of instructional technology: development, implementation, (or adoption if materials are developed elsewhere) and evaluation. Aside from the obvious collaboration required between teachers and technical support staff, faculty also need to join forces among themselves intra-departmentally and inter-departmentally as well as—especially in the case of less commonly taught languages—inter-institutionally. Needless to say, this implies a real paradigm shift in the way academics have traditionally gone about their business.

A second area in which technology-enhanced teaching is bound to have a significant impact is on curriculum content itself. Foreign language instructional technology today is not only serving curricular objectives but is also shaping them. As we've seen, pedagogical innovation in CALL is now very much bound up with learner-centered, constructivist, task-based, content-based methodologies. It has long been accepted that foreign language instruction should incorporate a cultural dimension. So it is not at all surprising to see this increased focus on content-based learning extend the domain of language instruction to include substantial contemporary culture/civilization studies. It's a pretty safe bet, however, that the quest for content will not limit itself to this domain. Opportunities for inter-disciplinary content courses will surely present themselves, with Foreign-Languages-Across-the-Curriculum initiatives a very good candidate.

Professional Development

As should be apparent, the collegiate collaboration required for the design, implementation, and evaluation of CALL materials cannot take place in a vacuum. Its realization is critically dependent on substantial infrastructure support. And where is this support going to come from if not the language resource center?

Language teaching faculty do not have to be specialists in CALL (or applied linguistics, instructional design, etc.) to be engaged in foreign language instructional technology. This is precisely why collaborative teams are required to pool expertise. On the other hand, the effective and efficient exploitation of instructional technology does presuppose knowledge and skill sets that have not been part of traditional academic expectations or training. And this, of course, is where the professional infrastructure support provided by a language center (or a more encompassing unit such as a center for language study) is so critical. Pedagogically, those involved in CALL need to have a firm understanding of the theoretical underpinnings of current language teaching methodologies. Technologically, foreign language faculty need to be comfortable with the tools of their trade. At the most basic level, they need to know how to operate essential hardware and software. While it is possible to leave all media editing to others, much can be said for the principle of self-sufficiency, especially when something is needed in a hurry and technical assistance is otherwise allocated. This doesn't mean that language teaching faculty have to become professional graphics or website designers either, but it can really be helpful to know the basics of audio, graphics, video and web page editing. If nothing else, it can greatly enhance the ability of instructors to communicate their needs to technical staff. More importantly, as students become more involved in technology as part of their task-based learning activities (e.g., student-produced video projects, web page production, multimedia portfolio creation), they will expect their teachers to possess at least as much technological competence as is required of themselves.

Conclusion

In providing the infrastructure to support the technological competence of faculty, there is no better model to follow than the one we advocate for our own students. We need to practice what we preach by basing professional development in instructional technology on constructivist, learner-centered, collaborative interaction. *C'est en forgeant qu'on devient forgeron,* as the French say, i.e., It's by blacksmithing that one becomes a blacksmith—people learn best with direct hands-on experience. And lastly, on the topic of professional development, it is important not to leave out of consideration our graduate students, and most particularly our

teaching assistants. They are the next generation of our colleagues and we have a serious responsibility to provide them with the pedagogical and technological competencies they will need to succeed.◆

Note

1. This data was kindly supplied by Otmar Foelsche, Director, Humanities Resources, Dartmouth College.

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