
A Developmental Perspective on Technology in Language Education

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Is technology a tool for language learning, or is language learning a tool with which people can access technology? This article suggests that both language and technology are tools for individual and societal development. The article introduces a developmental approach to integrating technology in language education, based on consideration of both product and process. It then illustrates these concepts through analysis of a large, U.S.-funded English language developmental program in Egypt. Two projects are examined: a teacher education program on computers in English language teaching and a basic English methodology course taught via videoconferencing. The analysis indicates that a developmental approach is critical to successful integration and use of technology in language education programs.

In the eyes of many educational technology specialists, the role of the computer in education has gradually been transformed from that of *tutor* to that of *tool* (see discussion in Warschauer, 1996). This is certainly the case in the field of L2 teaching, in which the most dynamic applications of computer-assisted language learning (CALL) involve simulations, electronic communication, and multimedia production rather than simple drill-and-practice tutorials (see examples in Egbert & Hanson-Smith, 1999).

But the question remains: A tool for what? Technology in TESOL is best understood not only as a tool for language learning but also more broadly as a tool for individual and societal development, which is broadly conceived as a reduction in participants' levels of vulnerability over things they do not control (Markee, this issue). This article illustrates the important tool functions of technology in development through a description of 3 years of research in Egypt, where I participated in a large donor-funded program for integrating a range of technology in English language teaching and teacher education at the K-12 and university levels. I first briefly expand on the theoretical

implications of the definition of development used above by examining the role of information and communication technology (ICT) in language learning from both a product- and a process-oriented perspective. I then describe research from the program suggesting that a developmental perspective should guide the products and processes of the integration of technology in TESOL.

PRODUCT AND PROCESS OF TECHNOLOGY IN LANGUAGE LEARNING

Product and *process* are critical to both language education and development theory (Markee, 1997a). In general theories of socioeconomic development, perspectives on the end product of what constitutes development have gradually changed from a vision that focuses narrowly on wealth to one that also includes broader issues of social inclusion and protection from vulnerability, encompassing literacy, health care, social equality, and democratic rights. This broadening definition of product is accompanied by an increased focus on process: “*how* development is gained” is viewed as “no less important than *what* benefits are obtained at the end of the development road” (Goulet, 1971, p. x), because only participatory and democratic involvement of people in their own developmental process can ensure that any change is sustainable. Development is therefore both a terminal state and a change process (Goulet, 1971, cited in Markee, 1997a.)

Language learning theory has also been marked by a broadened vision of the desired product and a renewed emphasis on learning process. A singular focus on the end product of grammatical competence has widened to encompass other forms of communicative competence, with the goal being not just formal knowledge but also the power to use language for meaningful interaction and agency (Warschauer, 2000). With this widening has come an increased emphasis on classroom processes or, actually, on the combination of product and process, from both a teaching (e.g., Breen, 1984; Candlin, 1984) and a research (e.g., Spada, 1987) perspective. Processes involving autonomous learning, collaborative learning, and the development and practice of language learning strategies are all designed to empower students to continue their own learning and communicative innovation outside the classroom (see the discussion in Markee, 1997a).

An Expanded Product: Electronic Literacies

A developmental approach to technology in language learning reflects these same two issues: an expanded product and particular attention to process. Starting with product, the rapid diffusion of ICT is shifting the goalposts of what it means to be a competent language user. For example, with the number of e-mail messages sent and received annually exceeding 3 trillion, according to an estimate 3 years ago (Pastore, 1999), e-mail has joined other media as an essential means of communication. Indeed, according to one study, a plurality of U.S. managers believe that e-mail is the principal means of communication in their business, surpassing the telephone, the fax, and even face-to-face conversation (American Management Association International, cited in Warschauer, 2000). Therefore, language teachers must not only use e-mail to promote English teaching (Warschauer, 1995) but also teach English to help people learn to communicate effectively by e-mail. Similarly, with the World Wide Web becoming an essential medium of information exchange in economic, academic, and civic affairs, the literacies of accessing and publishing Web-based information must also become part of English language teaching curricula. New *electronic literacies* (Shetzer & Warschauer, 2000; Warschauer, 1999a, in press) include computer literacy (i.e., comfort and fluency in keyboarding and using computers), information literacy (i.e., the ability to find and critically evaluate online information), multimedia literacy (i.e., the ability to produce and interpret complex documents comprising texts, images, and sounds), and computer-mediated communication literacy (i.e., knowledge of the pragmatics of individual and group online interaction). These literacies are important in many languages, but they are especially critical in English because even several years ago more than 50% of the world's online content was estimated to take place in English ("Cyberspeech," 1997). The extensive amount of online information and communication in English provides the possibilities and, in many contexts, the imperative to reconstruct the English language curriculum to incorporate technology-enhanced communication and project work (Warschauer, 2000).

The importance of these new literacies calls into question a basic tenet of CALL: that the computer is an optional tool to assist the language learning process but that technology does not transform the goal of what is to be learned (see, e.g., Kenning & Kenning, 1990). My ethnographic research with language learners in Hawai'i—including immigrants, foreign students, and native Hawaiians—indicated that they viewed technology not as a secondary, optional tool but as a critical added value to language education (Warschauer, 1999a). In other words, students in

technology-intensive language classrooms learned both language skills and valuable information/communication literacies simultaneously. This point was similarly brought home to me many times in Egypt, but never more so than when a high school English teacher expressed his view that “English is not an end in itself, but just a tool for being able to make use of information technology” (personal communication, August 24, 2000), thus standing on its head what I see as the perspective of CALL proponents. Although I understand the teacher’s sentiment, I would suggest instead that both English and information technology are tools—to allow individuals to participate fully in society.

And English and information technology are also tools for societies—to participate fully in the world community and advance politically, economically, and socially. With the successful institutional integration of information technology being one of the key factors in socioeconomic development (Castells, 2000), societies, schools, and teachers will not sacrifice the time, effort, and money required to implement technology-based instruction only for the goal of teaching the same English skills better than before. Rather, they will make these sacrifices because they believe that the mastery of technology, as part of the English curriculum and other curricula, is essential if their students and society are to fully develop.

An examination of new curricular standards in Egypt, Israel, Singapore, the United States, and many other countries indicates the value that national governments and ministries of education place on the goal of developing students’ expertise in information and communication technologies. As the Egyptian minister of education wrote,

Achieving the goals of development will necessitate preparation of a new cadre of professionals who are able to interact with the language of this age, and with the technology of the Information and Communications Revolution Therefore technological training should start at an early age and should include all aspects of education. (Bahaa El Din, 1997, pp. 120–121)

International language-training development projects, which often focus on development of language education management skills in addition to teaching skills, need to recognize the expanded role of ICT within the language teaching and broader educational enterprise. This entails developing institutional expertise and learning processes so that collectives and institutions can take leadership in adapting new technologies in ways appropriate to their circumstances. Language departments, schools, ministries of education, and professional organizations all need to enhance their leadership in effectively integrating information and communication technologies as a developmental tool. In summary, at all levels of language education, from the individual to the institutional,

active mastery of ICT, rather than just passive use, is essential for confronting the imperatives of an information society and economy.

A Process of Autonomy and Innovation

To achieve these expanded goals, whether at the individual or societal level, requires a reconsideration of the process of adopting technology. Because ICTs are changing and developing so rapidly, mastery of new technologies—whether by a student, a teacher, or an institution—necessitates a capacity for constant innovation and adaptation. The critical element here is *autonomy*, a concept that was valued in earlier stages of communicative language teaching but now takes on even greater significance. As Shetzer and Warschauer (2000) explain,

Flexible, autonomous lifelong learning is essential to success in the age of information (Reich, 1991; Rifkin, 1995). Autonomous learners know how to formulate research questions and devise plans to answer them. They answer their own questions through accessing learning tools and resources online and offline. Moreover, autonomous learners are able to take charge of their own learning through working on individual and collaborative projects that result in communication opportunities in the form of presentations, Web sites, and traditional publications accessible to local and global audiences. Language professionals who have access to an Internet computer classroom are in a position to teach students valuable lifelong learning skills and strategies for becoming autonomous learners. (p. 176)

The concept of autonomy must be extended beyond self-directed use of language and today's technology to the ability to develop, explore, evaluate, and adapt new technology as it evolves. This ability requires the development of metaskills of critique and innovation beyond the skills of deploying any particular technology. Students not only should be able to use today's search engines but should also have the right analytic framework to select and make use of new search engines as they emerge. Teachers not only should be able to use today's CALL software but should also have successful strategies for evaluating and adapting the new waves of software that will surely come. And institutions should have the capacity not just to make use of technologies but also to participate in the generation and improvement of technologies (Corea, 2000).

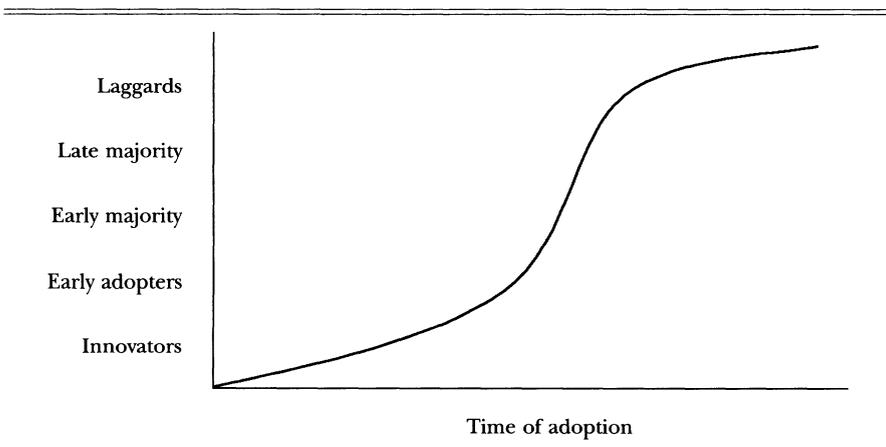
Extending the concept of autonomy in this way suggests a highly interactive and organic process, in which the development of a capacity for sustainability is of greater interest than are short-term results. It involves the application of general developmental principles of educational reform, such as showing respect for local circumstances and working within the parameters of local institutions (Holliday, 1992,

1994). The concept of local appropriateness is of critical importance, because access to and attitudes about information and communication technologies differ greatly in different parts of the world.

Developing this autonomy also necessitates an understanding of principles of social informatics, that is, the perspective of technology as a complex social system reflecting relations of culture and power rather than as the machines per se (Feenberg, 1991; Kling, 1999; Warschauer, in press). From a social informatics perspective, the implementation of ICT is not a one-shot deal involving the purchasing and installation of computers but rather a complex social process involving a lengthy restructuring of incentives, the development of different social relationships, and reconfigurations of power (Kling, 2000).

Finally, developing learner and teacher autonomy involves understanding and taking into account the principles of innovation diffusion. According to these principles, new ideas or innovations are not simultaneously adopted by all but are gradually spread through different categories of people along an S-shaped curve (see Figure 1; Rogers, 1967). The first people to grasp a new idea, labeled *Innovators*, are a small group of highly venturesome and risk-taking people. Members of the next group, the *Early Adopters*, are noted for the degree of opinion leadership they exert within their social networks; they are more cautious than the Innovators and are respected by their peers. After the Early Adopters take up an innovation, the rate of diffusion increases, as first the *Early Majority* and then the *Late Majority* come on board. These two groups together make up fully two thirds of society. Finally, the last

FIGURE 1
The S-Shaped Curve of Adoption Innovation



Source: Adapted from Rogers (1967, p. 177).

group, termed *Laggards* by Rogers, consists of those people who are highly resistant to an innovation and may wait a long time before adopting it.

Because of this process, long-term, in-depth training of a cadre of change agents who can provide ongoing leadership within a particular social system is a critical component of development. It is especially important to mobilize Early Adopters in such training because this group, due to its opinion leadership, is critical for the success of an innovation.

To explain further the developmental perspective on technology and language education, I now discuss examples from a large-scale English language development project in Egypt. Data on this project were collected over a 3-year period (1998–2001) from sources including participant observation, interviews, focus groups, Web sites, transcripts of e-mail messages, and Ministry of Education and university documents.

INTEGRATED ENGLISH LANGUAGE PROGRAM-II

The Integrated English Language Program-II (IELP-II) is funded by the U.S. Agency for International Development (USAID) to improve English language teaching in Egypt. It is the latest incarnation of a quarter-century of U.S.-funded language aid projects in Egypt. These projects began in the mid-1970s (see Bowers, 1983), when the U.S. government was actively trying to court Egypt into the U.S. political and economic camp. Aid to Cairo, including aid for language projects, greatly expanded in the 1980s after Egyptian President Anwar Sadat signed a peace accord with Israel. Washington's aid to Cairo was seen as a reward for the accord, an incentive to keep Egypt in the Western camp, and a developmental tool to integrate Egypt into the U.S.-led globalized economy (Weinbaum, 1986).

IELP-II was launched in 1997 on the heels of IELP-I, a teacher education project that took place from 1984 to 1996. IELP-II was designed to be as much an economic development program as an educational one; it originated in the section of USAID that supports economic reform programs in Egypt, and it sees its long-term impact as "improved English language proficiency for the current and future work force of Egypt" (*IELP-II—About*, 2000, n.p.). IELP-II focuses not only on language pedagogy, curriculum, and materials development but also on issues related to the management of English language education and training programs.

IELP-II places a great premium on institutional change and sustainability. The program does not bring U.S. instructors to Egypt to teach directly but instead emphasizes training and assistance programs

to increase the capacity of Egyptian educational institutions. As in many international aid projects (see also Kenny & Savage, 1997; Markee, 1997a), though, the supposed emphasis on sustainability in IELP-II is complicated by a range of international and local factors that shape the design, funding, and implementation of the project. From the U.S. side, these include a USAID-mandated emphasis on numerical milestones (such as a certain number of teachers trained per year in a certain activity). Because funding to the USAID subcontractors depends on reaching these milestones, they are given great priority, but the pursuit of numerical goals does not always cultivate the patient, behind-the-scenes work required for enhancing sustainability. From the Egyptian side, the tremendous largesse of the IELP-II program—with \$52 million to spend over a 6-year period—had a distortional affect, influencing many collaborating institutions to seek a piece of the pie to address urgent short-term problems rather than long-term development needs (see discussion in Smith, 1997). More explicit political issues also affected the nature of the IELP-II program and its ability to bring about sustainable change. For example, at one point during the Camp David negotiations led by U.S. President Bill Clinton, USAID made plans to divert millions of dollars of aid money from Egypt to the Palestinian Authority, thereby forcing IELP-II to suddenly cut back on some of its training programs.

These emergency reductions notwithstanding, IELP-II is believed to be the largest donor-funded program in the world for assisting English language teaching in a developing country. At its height IELP-II employed approximately 60 full-time staff (including 11 Americans and about 50 Egyptians), working under two USAID subcontractors, the Academy for Educational Development and America-Mideast Educational and Training Services. This full-time staff is assisted in its efforts by scores of U.S. and Egyptian part-time consultants from the fields of TESOL, applied linguistics, assessment, evaluation, educational management, and educational technology.

The work of IELP-II is focused in three main sectors: (a) with the Egyptian Ministry of Education (to improve, e.g., in-service teacher education, management of English language programs, use of technology); (b) with Egyptian university colleges of education (to improve in-service education of future English teachers); and (c) with English for specific purposes (ESP) and English for occupational purposes programs. Technology is considered a crosscutting area that has projects in all three of these sectors. Work on educational technology projects has been managed by a nine-person team within IELP-II supplemented by the assistance of U.S. and Egyptian consultants and working in partnership with Egyptian educational and nongovernmental bodies.

I now briefly describe two technology-based projects coordinated by IELP-II to illustrate the developmental approach discussed above.

Professional Development in Computer and Internet Use

One of the objectives of IELP-II is to help Egyptian educators make use of new technologies in ways that are appropriate to their own circumstances. Toward this end, IELP-II has carried out a professional development program in computer and Internet use for English language teaching. The program was developed following a national needs analysis (reported in Warschauer, 1999b) demonstrating that there was a fair amount of computer equipment in Egyptian schools and universities but little knowledge of how to use it for language instruction and professional purposes. There were no CALL organizations in the country, no Web sites or public e-mail lists for English teachers, and no other form of organized leadership on the issue of technology for English teaching.

Based on this situation, IELP-II placed priority on developing a leadership core for the future of technology in English teaching in Egypt. Rather than conducting undifferentiated short-term education for large numbers of teachers, IELP-II chose a strategy that was based on an understanding of the aforementioned S curve of innovation. As a first step, main emphasis was put on developing and consolidating a relatively small group of change agents who could exercise leadership in this area. As a second step, these leaders were helped in reaching out to others around them both to deepen their own knowledge and to build a larger group of early adopters. The intended product of IELP-II's program was thus an informed, organized leadership core with knowledge of and expertise in the use of technology in language teaching as it applied to the Egyptian context. The process involved working to develop a leadership cadre and then providing scaffolding to assist this leadership cadre to reach out to a broader group of early adopters.

Step 1: Developing a Leadership Cadre

To develop a group of leaders with expertise in technology for English teaching, IELP-II established a 2-year education program. Approximately 100 people participated in this program in three groups of 30–35. Groups were made up of English teachers, English language supervisors, and English methodology specialists from schools, universities, and ESP centers.

The program was entitled Computers in English Language Teaching (CELT). The name was chosen to emphasize the broader role that computers can play in English language teaching rather than the narrower role suggested to me by the better known term of CALL. The content of the CELT program was tied as closely as possible to the actual needs of Egyptian teachers and learners as identified through the needs analysis. Technology instruction included simple tasks such as the creation and use of e-mail lists for professional discussion, the use of office software to develop materials or prepare presentations, and the use of the Internet for finding information or creating professional Web sites. The program selected free or advertiser-supported software over commercial software so that teachers could readily replicate what they had learned in their own situations. Modules on classroom use of technology focused in large part on the one-computer classroom, which reflected the current conditions of Egyptian schools. Participants who completed the CELT program were thus prepared to provide leadership in the areas most needed by Egyptian teachers.

All participants in the CELT program had to go through a rigorous application process that evaluated their expertise in English language teaching methods, their experience with technology, and their leadership potential. Applicants had to propose, and present in a personal interview, a specific technology-based project that they would implement in their own schools, universities, and regions. People were chosen to participate either because they were Innovators who were already experimenting with technology in the classroom and had some valuable lessons to share, or because they were potential Early Adopters with an interest in technology and with good ties to the broader educational establishment (see Markee, 1997b, for discussion of the complementary roles of Innovators and Early Adopters).

The CELT program consisted of three main parts:

1. *pretraining*: For 1 year, CELT members participated in short computer-training workshops in Egypt and formed teams to further plan their projects. The CELT members met in Cairo and continued discussions online to prepare for their main training and their project work.
2. *main training*: After the first year, CELT members participated in an intensive 1-month program in the United States, where they learned about CALL and carried out work on their projects.
3. *follow-up implementation*: Following the main program, CELT members continued their efforts by completing their projects, implementing their projects in their schools, continuing discussion over e-mail, participating in advanced workshops in Cairo, and sharing what they had learned with their colleagues by leading their own local work-

shops and participating in a national Electronic Oasis (see discussion below). Finally, in 2001, a national CELT conference was held so that members from the three CELT groups could share ideas together and view each other's projects.

Some of the CELT members' projects were in areas that I might not think of as CALL. One professor, for example, helped launch an English language Web site for his university. Although such a project might not be directly related to English language teaching in the classroom, the project served to highlight to Egyptian educational institutions the value of integrating technology and English and inspired other universities and departments to later launch or improve their own English language Web sites, thus facilitating professional networking. Some CELT members launched electronic discussion lists to network English teachers in particular regions or programs. Other CELT projects focused on topics such as developing multimedia presentation content for the one-computer classroom and creating video-based listening exercises for university English courses.

One special success of the CELT program was the work of an English teacher, Ahmed, who was blind. During his study in the United States, Ahmed gained experience with English language assistive technology for the visually impaired. Upon his return to Egypt, he organized a number of follow-up sessions on the topic for other teachers who were blind and for the broader educational community. His leadership in this area was recognized by the United Nations Educational, Scientific, and Cultural Organization, which invited his cooperation in launching an electronic library for people who are visually impaired, at the recently opened (or reopened, after 18 centuries) Bibliotheca Alexandrina (Library of Alexandria), with 10 specially designed computer stations providing materials in English, Arabic, and other languages.

In addition to the CELT program, a number of other efforts were carried out to help consolidate a group of innovators made up of the CELT members and other highly interested teachers. Most important, a national Educational Technology Special Interest Group (Ed Tech SIG) was launched within EgypTesol. Though the Ed Tech SIG was founded by an American working for IELP-II, it is now under the leadership of Egyptians and chaired by an Egyptian applied linguist. The Ed Tech SIG carries out a number of its own training and education programs to further effective use of technology in TESOL.

Step 2: Reaching Out to More Early Adopters

Research indicates that the work of change agents is important in fostering innovation only if they have good ties to a broader community

(Markee, 1997a; Rogers, 1967). A critical next step in promoting effective technology use in Egypt was thus to promote ties between the initial leadership cadre and the broader English-teaching community in Egypt and, in particular, with those who had the potential to become early adopters.

Toward this end, IELP-II coordinated closely with the Ministry of Education and Egyptian universities to assist the CELT members in organizing 1-week follow-up workshops in their own locales. This coordination was challenging, as the Ministry of Education was not used to facilitating this kind of grassroots initiative. Although thousands of Egyptian classroom teachers had traveled abroad for education programs over the past two decades, no systematic initiative had previously involved them in providing substantial, ongoing follow-up to their colleagues. Though arrangements were eventually made to carry out this follow-up, it was accomplished only after a great deal of delays, obstacles, and resistance, with some CELT members facing problems even getting Ministry of Education approval for leave to attend follow-up meetings.

Each workshop was led by 1–4 CELT members and included 5–15 local teachers, depending on the size of the laboratory available. The content of these workshops was similar to that of the initial workshops taken by the CELT participants and focused on the mastery of basic tools, such as word processing and presentation software, the Internet, and the applications of these tools to professional communication and English teaching. Approximately 1,000 teachers participated in these follow-up workshops, and, as indicated by this statement by one CELT member, some of them continued the cascade or snowball effect by teaching colleagues at their school sites:

I am very happy these days really because my dear trainees have started applying what they have already learnt in the workshop in their own schools. One of them called me yesterday and informed me he has taught the computer technician and another teacher of English in the same school how to use Microsoft PowerPoint and they were interested and the three started preparing a PowerPoint Presentation for their pupils. This is only a start and I am expecting more and more feedback from other trainees who were all under zero in the fields of technology. (personal communication, March 27, 2001)

In addition to these local workshops, an Electronic Oasis is organized each year at the annual Egyptesol conference. At the Electronic Oasis, CELT members and others involved in the Ed Tech SIG give hands-on demonstrations to the many hundreds of English teachers in attendance. A total of 120 such demonstrations were given at the November 2000 Electronic Oasis, reaching an estimated 500 teachers. Topics at the

electronic oasis range from the basic, such as getting a free e-mail address, to the sophisticated, such as the authoring of multimedia.

Finally, CELT and Ed Tech SIG members also manage several Web sites for Egyptian English teachers as well as a national e-mail discussion list, ELTEGYPT, which includes some 400 educators. The list has been used for everything from announcement of local education programs, to commiseration over obstacles to using of technology in schools, to discussion of how the Israeli-Palestinian conflict should be presented in the English language classroom. (The latter topic generated intense debate when the Mideast conflict flared in 2001, as some teachers wanted to use the list for free-flowing discussion of political issues whereas others felt that a list for English language teachers should only include political discussion to the extent that connections were made to education or language issues.)

These achievements of the CELT program, though important, are still relatively minor compared with the broader challenge of integrating new technologies in English language classrooms in Egypt. The 1,000 teachers reached so far represent only a tiny proportion of the more than 60,000 English teachers in Egypt. And even these 1,000—and indeed, even the leadership core of 100—face serious obstacles in actually using computers and the Internet in their teaching. Some of these obstacles involve lack of access to equipment: There are too few computers in Egyptian schools to allow daily classroom use by English students. In addition, many administrators are reluctant even to use the computers that they have for fear that they will be broken. As one CELT participant complained on the group e-mail list, the school technology staff “know only how to unplug and cover it to protect the computer from dust so as not to be damaged” (personal communication, February 25, 2001). And even with access to computers, Egyptian teachers face additional obstacles to using them creatively with their students, including huge class sizes, a centralized test-driven curriculum, and a school culture that discourages innovation (see discussion of these issues in Jarrar & Massialas, 1992; Sarhaddi Nelson, 2001; Tawila, Lloyd, Bensch, & Wassef, 2000). A frequent complaint of CELT participants is that they do not have sufficient support or opportunity to put their new knowledge and skills into practice.

However, the high motivation of CELT participants has led many of them to seek ways to introduce technology in their teaching, even in difficult circumstances. An excellent example is the classroom activity of Mounira, a CELT participant who teaches English literature at an urban university and whose success illustrates well the principles of electronic literacy and autonomous learning discussed earlier. Lacking access to any departmental or university computers for her teaching, Mounira

began to involve some individual students in tracking down online information on English poems from their home computers. These students made wall posters about what they found online and gave oral presentations to the other students in the class. These posters and presentations generated so much curiosity about the Internet that the class organized voluntary after-class field trips to the public-access computers at a nearby library. Groups of students, most of whom had never sat in front of a computer, worked in pairs at the library computers to sign up for free e-mail accounts and learn how to use the World Wide Web. These newly connected students then started to do their own online research on English poets, leading to more classroom presentations and eventually to an online collaboration with students in another English class taught by a CELT participant at a different university. Mounira explained to me by e-mail how all this activity reshaped class dynamics:

Two other students gave a presentation on the inauguration poems delivered by Robert Frost and Maya Angelou (another poet they're studying this term) in the inauguration ceremonies of Kennedy and Clinton. One of the two students had come over to me a few days earlier and accusingly said: "I haven't done a presentation yet". I could barely keep myself from laughing out loud. I have never had a student before *ask* to give a presentation! In fact, this same girl had come over to me at the beginning of the semester in tears because she had flunked her previous English course. The final assignment is happening right now. It's a collaboration between three of my students and Laila's students [a class of a CELT participant at another university]. I thought my students would simply rewrite online what they had come up with in class but they're doing more than that. They seem to have formulated insights about the poem which I have no idea where they got from! I can only think of one word: motivation. I haven't had such a fulfilling experience in a long time. I keep receiving emails like "please reply now!" or "I sent you an email, you didn't get it?" Or students submitting entries for a poetry competition, on the deadline, through attachments, and requiring immediate confirmation. I'm not complaining, because to me it's nothing short of a miracle and I'm just so happy to be a witness to it. (personal communication, April 2001)

Though Mounira started by just wanting to get her students access to the content on the Internet, she came to strongly value the autonomous processes involved. When told that she could simply give out handouts rather than have students find information themselves online, she replied, "It's not the handout I'm interested in as much as the process of the students retrieving that handout themselves and using the Internet to do that" (personal communication, January 2002).

The excitement generated in Mounira's class reflects the positive attitude of many educators and students in Egypt toward the CELT

program. Though it has not yet reached a large percentage of Egyptian teachers nor received sufficient institutional support from the Ministry of Education, the program's strong grassroots orientation has earned it the reputation as one of IELP-II's best projects. Key to the success have been a strategic focus on the development and consolidation of change agents, a cascade training approach that works through change agents to reach other early adopters, a focus on content and tools appropriate to the current developmental conditions of Egypt, and a fostering of ongoing sustainable leadership networks and structures. Whether and how this group breaks through its still relatively small circles to help effect lasting change within the broader system of schooling remains to be seen, though substantial underlying problems with Egyptian educational institutions as well as a broader political, economic, and cultural climate that discourages innovation make the possibility of any rapid breakthroughs unlikely (Warschauer, in press).

Teacher Education via Videoconferencing

A second IELP-II program worth examining is a teacher methodology workshop conducted via videoconferencing. The workshop has instructed some 3,000 teachers in 3 years in areas of basic English language teaching methodology. Lessons learned in conducting and improving the workshop over a 3-year period support many of the points discussed above.

The intended product of the videoconference workshop, as initially conceived, was trained teachers. Specifically, the workshop sought to reach large numbers of teachers who could not ordinarily attend workshops in the few major cities where they are usually held and help these teachers acquire the knowledge, skills, and attitudes required to carry out effective communicative language instruction in their classrooms.

The process chosen to achieve this goal was a 1-week videoconference workshop. During the first year of the program, two 1-week workshops were held (each with a different set of teachers), covering the principal aspects of basic English language teaching methodology. The workshops were held in the Egyptian Ministry of Education's videoconference halls, a set of 27 centers scattered throughout the country. These halls enjoy multipoint communications capacity; a speaker from any one of the 27 sites can communicate by video and audio to all the other 27 sites simultaneously.

The workshops were taught by university teacher educators, who delivered the workshops from Cairo over the videoconference network. Discussion at the 27 sites and across sites was managed with the assistance of two or three facilitators at each site, most of whom were working for

the Ministry of Education as English language supervisors in the schools and who had come to Cairo for a few days of training in videoconference facilitation prior to the workshops. Approximately 600 public middle school English teachers participated in each of the 1-week workshops, for a total of 1,200.

Unfortunately, the communicative medium of videoconferencing did not prove rich enough for an effective workshop. The sound quality was not as good as in face-to-face communication, and the Cairo-based teacher educators could not adequately assess the conditions at each site (because they could only view 1 of the 27 sites at a time). In addition, teachers complained that they found the presentations too theoretical and that they failed to adequately address classroom conditions in Egypt. Lack of direct follow-up between the teacher educators and the teachers also proved to be a serious problem, because it was unclear what elements of the workshop, if any, teachers were able to implement in their classrooms. A formal evaluation team found that the program had little lasting impact on the participating teachers.

During the next 2 years, both the intended product and the process used in the program were redesigned to better reflect a developmental perspective. The product, or goal, was reconceived to place greater emphasis on sustainable change at both the teacher and the institutional level. Individual teachers were expected not only to master knowledge and skills of communicative language teaching, but also to be able to reflect on teaching techniques and approaches in light of their classroom circumstances and continually adjust and adapt as necessary. At the institutional level, a goal was to develop the capacity of the Ministry of Education and its personnel to develop and carry out its own effective teacher education programs via videoconferencing in the future.

Adjustments were made in the process to support these expanded goals. The two separate 1-week workshops were replaced by a single, year-long workshop with different parts. Specifically, 600 teachers participated in a 1-week workshop early in the academic year, in a series of 1-day follow-up videoconference workshops throughout the year, and in follow-up assignments between the workshops. These assignments including trying out in their classrooms what they had learned in the videoconferences, keeping reflection logs and portfolios, and carrying out peer observation. The 1-day follow-up videoconference sessions then focused directly on challenges and problems that teachers faced as they tried to implement what they had learned in the classroom. This reorganization of the videoconference workshops meant that only 600 teachers instead of 1,200 were reached per year, but they were in effect participating in a year-long program with a good deal of on-site follow-up rather than in a 5-day program with no follow-up at all.

The role of the local facilitators changed as well. Although they

previously had just helped guide discussion during the videoconferences, they now also helped manage the school-based follow-up by visiting and observing teachers at their schools, reading over their journals and portfolios, and conducting meetings with teachers in their area. This school-based follow-up added a note of seriousness to the workshop, as the participants knew that they were expected to reflect on and try out what they had been introduced to in the videoconferences and that they would be offered support and guidance to ensure that this occurred.

The facilitators were also invited to contribute their own considerable expertise, based on years of local teacher supervision, by making presentations as part of the videoconference workshop. All the facilitators were invited to submit formal proposals for presentations they would like to give in the workshop. Those with the best proposals made presentations over the videoconferencing network during the 1-day follow-up videoconference sessions. Topics of these proposals included techniques for teaching reading, the effective use of visual displays, and the use of pair and group work in class. The facilitators usually collaborated with colleagues in their locations—in some cases participants in the CELT network—to develop multimedia material to support their videoconference presentations.

These presentations were an important step forward, because there is a huge social and educational gap in Egypt between Ministry of Education employees (whether teachers or supervisors) and university professors. Having the local facilitators, who are Ministry of Education supervisors, join the university professors in giving presentations over the national videoconference network was a small step in bridging this gap. The facilitators' presentations were not as polished as those of the university professors, but their knowledge of teachers' working conditions was much greater, as they worked daily supervising teachers in the classroom. They could thus fashion presentations that directly addressed teachers' needs, which added credibility to the entire workshop.

The preworkshop program for the facilitators was redesigned to reflect the expanded role they played in the program. Beyond topics of workshop facilitation, it also included topics such as how to organize peer observation, keep and evaluate teaching portfolios, make effective proposals, and make effective presentations.

Technology was used to support the new school-based emphasis. A video team from Cairo traveled to different parts of the country to film teachers who were implementing in the classroom what they had learned in the workshop. This video gave the leaders of the workshop a better understanding of how teachers were acting on what had been previously covered and thus allowed the leaders to refine the content of the course. More importantly, the videos were then shown in the follow-up workshops and served as a powerful stimulus for discussion among the

workshop participants. Ordinary classroom teachers showed great courage in having their own unrehearsed classroom teaching observed and critiqued by hundreds of their peers from throughout the country.

With presentation and discussion of this classroom video, the workshops became less a lecture from Cairo and more a reflective interaction based on teachers' discussion of actual examples of their peers' practice. Workshop participants who were perhaps shy about attempting new techniques in the classroom could see with their own eyes that the material covered in the course not only was theoretical but could actually be interpreted into classroom instruction in an Egyptian context. Lively discussions ensued as teachers observed and discussed videotapes of their colleagues trying out new techniques, with the very teachers featured in the videotapes available to explain their pedagogical strategies and respond to follow-up questions. For example, one video clip showed Hanaa, a teacher from a small town in a rural area, using small-group role playing to reinforce a grammatical point. The hundreds of teachers at the 27 sites then actively debated over the videoconferencing system whether Hanaa's teaching strategies were practical in their own classroom and how they might have managed things differently. At many times, these debate and discussion became quite animated, as teachers from several sites competed to gain the floor and explain their views.

Over 2 years, the videoconference-based training was thus transformed from an activity that was somewhat removed from teachers' actual needs and experiences to one that many of the teachers viewed as highly relevant and valuable. As one teacher from a small town in the Sinai said, "I've been in many training workshops, but none of them were so closely related to what I actually needed in the classroom. This workshop allowed me to learn about things that were directly related to my own teaching needs" (personal communication, May 11, 2000).

In summary, the infusion of videoconferencing did not bring many positive changes, but when videoconferencing was carried out in a way that better reflected the developmental needs and conditions of the local actors, important gains were achieved. Changes included focusing on the overall system of instructional support—in this case, a longitudinal school-based program—that could be integrated with a technology-based distance education. These changes also involved the education and development of a leadership cadre, the facilitators, who gained expertise in all aspects of videoconference-based education, including learning to conduct effective presentations themselves over the videoconferencing system. Through this effort, and especially through the close work of the facilitators, a leadership cadre was formed that could help lead technology-mediated education programs in the future.

As in the CELT project above, the long-term impact of the videoconference workshops is difficult to foresee. Unfortunately, the

Ministry of Education unit that organizes other videoconference workshops is made up exclusively of experts in the technical matters of video, computers, and telecommunications, with no specialists in pedagogy. Those in charge of the unit appeared to recognize the value of the IELP-II videoconference program and spoke positively of the interactive features that they witnessed, but it is unclear the extent to which such features will be incorporated into their own education programs, which are more similar to the first round of IELP-II videoconferencing (short programs with limited interaction) rather than the improved later version. In the long run, the Ministry of Education's Technology Development Center, which manages the videoconferencing unit and other Ministry technology programs, needs to develop more expertise and emphasis in pedagogy and curriculum rather than solely in technical matters, but IELP-II has not been able to bring about that change.

Other Projects

The length limitation of a journal article does not allow a full discussion of all the challenges, successes, and failures of IELP-II's work with technology in education. The two relatively successful projects described here were chosen for discussion because of their common link to issues of technology, training, and capacity development, but some other technology-based projects were not so successful.

For example, an effort to install two model CALL laboratories stalled for years, caught between the differing priorities of the donor (USAID) and the recipients (the Egyptian Ministry of Education and a university college of education; see discussion in Warschauer, *in press*). And even the projects described above were limited in their impact, reaching a small percentage of Egyptian teachers and failing to achieve full integration in Egyptian educational institutions. This failure reflected a more general shortcoming of IELP-II's work: an inability to help further institutional reform within the Ministry of Education so that the ministry itself could provide better ongoing leadership in improving teacher education and language education. This failure in turn was due to broader donor-recipient contradictions in the aid dynamic (as discussed, in general, in Hall, 1997; Smith, 1997) and reflect the fact that Egypt and its educational system were targeted for U.S. aid projects for geopolitical reasons rather than because of a good match between the development perspectives of the donor and recipient (Weinbaum, 1986). Overcoming these larger contradictions was beyond the capacity of either IELP-II or the Egyptian teachers it worked with.

However, the shortcomings of IELP-II's work were balanced by some important successes, particularly in areas related to technology in

language teaching. A leadership core, made up of innovators and early adopters, has emerged within the educational system to discuss and promote effective uses of technology in language learning. This technology- (and pedagogy-) savvy network can now play a leadership role similar to that of comparable networks in other countries (e.g., the Japan Association for Language Teaching's Computer-Assisted Language Learning Special Interest Group). And a number of Egyptian language educators have also begun to share their expertise on these issues internationally by presenting on educational technology topics at international conferences and participating in the international leadership of CALL organizations. This participation allows Egyptian educators to help define the future of CALL rather than only implementing technologies and approaches that are designed abroad.

CONCLUSION

"Technologies like computer systems belong to the realm of expressive tools of human nature," writes Corea (2000, p. 9). Rather than "foisting such technologies haphazardly on people," he continues, we should instead foster "the long-term nurturing of behaviors intrinsically motivated to engage with such technologies." It is thus crucial to "engender a systemic tendency to toward innovation in social units," and this requires "an 'innovating' rather than a 'borrowing' strategy" (p. 9). Quoting Perez and Soete (1988), he adds that "a real catching up process can only be achieved through acquiring the capacity for participating in the generation and improvement of technologies, rather than in the simple use of them" (Corea, p. 9).

In the area of language education, this translates into the essential role of a body of teachers with the knowledge, skills, and attitude for innovatively designing, adapting, and applying technology in the classroom, appropriate to local context. This crucial role of human capacity and motivation for technological innovation was recognized by an Egyptian university lecturer, who told me several years ago that "we have the hardware, we have the software, but we lack the humanware" (personal communication, May 2, 1998). Even then, the statement was exaggerated, but the speaker's emphasis on human development and leadership provides an excellent framework for ESOL educators who seek to make effective use of ICT. The goal in TESOL, and especially in considerations of how to make use of technology, should be not only development of the language but also development of the person. At the classroom level, that implies helping students not only use technology as an instructional aid but also master technology as a medium of communication, research, and knowledge production. At the professional level,

that implies developing networks of innovators with expertise in technology-enhanced teaching, teacher development, and educational reform.

As the experience in Egypt demonstrates, these “products” also require a rethinking of the process of teaching and educating teachers with technology. Whether one is working with students or teachers, a developmental approach for technology and language learning requires a long-term process emphasizing initiative, autonomy, reflection, and the self-generated capacity for innovation. Through such an approach, TESOL professionals can enable people to make use of all the tools available to them—and especially the two powerful and intertwined tools of English language and information technology—to achieve their developmental goals.

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ERRATUM

In “The Effects of Nonnative Accents on Listening Comprehension: Implications for ESL Assessment” (Vol. 36, No. 2, Summer 2002), the affiliations for Roy C. Major and for Ferenc Bunta should have read “Arizona State University, Tempe, Arizona, United States.” *TESOL Quarterly* regrets the error.