

Chapter 1

SLA, Language Teaching, and Technology

An Overview

WHY TECHNOLOGY IN THE L2 CURRICULUM?

Why should any foreign-language educator or student in the process of learning a second language (L2) have any interest in technology given that L2 learning is such a social, if not face-to-face, process? The answer lies in looking closely at the facts of second language acquisition (SLA) and the resources at hand.

SLA, the process of learning another language other than your mother tongue (L1), is both an intensive and time-consuming activity.¹ After years of experience in training field agents, the Foreign Service Institute (FSI) estimates that anywhere from 700 to 1,320 hours of full-time instruction are needed to reach a level of high fluency (Bialystok and Hakuta 1994, 34). More specifically, the time commitment for learning a Romance language minimally approaches 20 weeks of intensive, full-time study at 30 hours per week, for a grand total of 600 hours, while for other languages, such as Russian and Chinese, the ideal exposure can exceed 44 weeks at 30 hours per week, or 1,320 hours. In stark contrast to these calculations, most university students spend on average only 150 hours per academic year actively studying a second language (10 weeks at 5 hours per week for three quarters = 150 total hours). Upon graduation from college, students of whatever second language just barely reach the FSI's lowest threshold requirements for achieving proficiency, that of the Romance languages. For students studying a non-Romance language at the university level, four years of second language study are not sufficient to obtain functional proficiency, according to these FSI estimates.

For those students who began studying a second language in high school and continued at the university level, the picture still does not seem much brighter. Many educators and public figures have expressed dismay that so much university language work appears to be remedial, because much of the material taught was already covered in high school. But in light of the FSI statistics, this is not really the case; it simply takes from four to six years to reach functional proficiency in a second language. Crucial to this L2 processing is the extent and nature of the input received—something all linguists and SLA researchers can agree on, even if their SLA models differ radically (discussed later in this chapter). In any event, university L2 learners, in terms of time on task, do not compare too unfavorably with children learning a first language during the first five years, with phonetic accuracy or accent perhaps being a notable exception (DeKeyser 2000).

How can this realistic, if not sobering, depiction of adult SLA be sped up and made more efficient? Increasing contact with the target language is the most obvious solution. In particular, going to the region(s) where the target language is spoken and immersing oneself in the society and culture clearly remains the preferred but most expensive method of acquiring linguistic competence in another language. However, Davidson (2007, 277) warns that less than 3 percent of our university students go abroad on either academic or internship programs. What happens to the majority of our nation's L2 students who are unable or unwilling to take advantage of study abroad? Most SLA theorists would agree, in some basic formulation of the issues, that formal L2 teaching is often unsuccessful because learners receive impoverished or insufficient input in the target language (Cummins 1998, 19). Technology, then, if used wisely, could play a major role in enhancing L2 learners' contact with the target language, especially in the absence of study abroad. Whether technology fulfills this promise depends on how it is used in the curriculum. The principal focus of this book is to discuss how technology can best be employed in the foreign-language curriculum in order to enhance and enrich the learners' contact with the target language and thereby assist the SLA process.

A few words of caution, however, are in order from the outset. First, technology only provides a set of tools that are, for the most part, methodologically neutral. Selber (2004, 36) has called this attitude toward technology the tool metaphor: "From a functionalist design perspective, good tools become invisible once users understand their basic operation." In reality, all

tools mediate our experiences in certain ways, which is to say that they are not totally value free. Applied linguists working within an ecological framework would say that every technology provides certain affordances and therefore is not neutral (Zhao et al. 2005; Levy 2006, 13–15).

Despite this word of caution, how technological tools are used should largely be guided by a particular theoretical model and by those who practice it. In this book I affirm the basic approach to SLA that claims that a second language is best learned and taught through interaction (for a similar endorsement, see Long 1991, and with reference to the computer learning environment, see Chapelle 2001). Pica, Kanagy, and Falodun (1993, 11) represent well the interactionist stance when they state, “Language learning is assisted through social interaction of learners and their interlocutors, particularly *when they negotiate toward mutual comprehension of each other’s message meaning*” (emphasis added). The question examined in this book, then, is whether technology can offer the L2 curriculum certain benefits within this theoretical framework, and if so, how these technologically assisted activities should fit in with the FL curriculum.

At first blush this theoretical approach as applied to the field of computer-assisted language learning (CALL) might appear counterintuitive, ironic, or even futile. After all, computers are not human and cannot interact with anyone in the sense that two human beings can. Nevertheless, Reeves and Nass (1996, 5) have convincingly argued the following: “People’s interactions with computers, television, and new media are fundamentally social and natural, just like interactions in real life.” In their research they found that users are polite to computers and respond to the personality of both the interface and whatever computer agents are present. In other words, computers are social actors as well, at least from the students’ perspective, which is all that really matters (28). Reeves and Nass’s research further reinforces the notion that computers can make a significant contribution to the SLA process because the students themselves feel that they are interacting with the computer in a real social manner. The question of whether computer-mediated communication is facilitative to the acquisition process will be examined in more depth in chapter 5.

The book’s second disclaimer is that this is not a how-to manual: I will not be instructing readers how to get connected to the Internet, how to write home pages in html or JavaScript, or how to program in Macromedia

Director. There are plenty of technical guides or workshops designed to teach these hands-on skills. Rather, this book focuses on why certain technological tools should be integrated into the L2 curriculum and what potential contribution these tools stand to make to any given language program. My objectives are to stimulate the technologically inexperienced readers to go out and acquire the necessary hardware and technical skills to begin incorporating technology into their classrooms. For the language professional who already has some knowledge of technology, I promise to stimulate the imagination for what might be done with computers in the L2 classroom, now and in the near future. All language professionals need to become acquainted with the potential advantages of using technology in their programs. Without some general claims to success and media superiority, chairs, deans, and other decision-making bodies won't understand or support new ways of teaching second languages with technology.

It is misleading to talk about technology as if one were dealing with just a single, homogeneous tool; different technologically based tools render different advantages for L2 learning. For instance, the Internet is an ideal tool for allowing students to gain access to authentic L2 materials; it might be the next best alternative to actually going abroad. L2 students can virtually "travel" to French-speaking Africa, Tokyo, or the Peruvian Incan ruins of Machu Picchu with just a click of the mouse. Non-English pages account for 68 percent of the postings on the web.² More important, the web gives all peoples a channel to express their voice, promote their self-image, and legitimize their goals. This sense of authenticity provides endless topics for cross-cultural analysis and discussions in any content-driven classroom.

The advantages for carrying out online discussions via computer have been well documented in the research literature (see chapter 4 on computer-mediated communication). Researchers frequently cite the computer's usefulness as: (a) a text-based medium that amplifies students' attention to linguistic form (Warschauer 1997b); (b) a stimulus for increased written L2 production (Kern 1995); (c) a less stressful environment for L2 practice (Chun 1998); (d) a more equitable and nonthreatening forum for L2 discussions, especially for women, minorities, and nonassertive personalities (Warschauer 1997a, 1997b); and (e) an expanded access channel with possibilities for creating global learning networks (Cummins and Sayers 1995). Swaffar (1998, 1) has summarized the benefits derived from computer-mediated

communication (CMC) as compared with classroom oral exchanges: "Networked exchanges seem to help all individuals in language classes engage more frequently, with greater confidence, and with greater enthusiasm in the communicative process than is characteristic for similar students in oral classrooms."

Ironically, telling students that their responses will also be saved by the computer for research purposes (see chapters 4 and 5) does not seem to diminish their level of participation or their sense that the computer affords them a relatively anonymous, or at least protected, environment for their discussions (Pellettieri 2000).

More important, 84 percent of teenagers today, who will be the college language learners of tomorrow, use the Internet primarily as a tool for communications through instant messaging (IM) and text messaging (Lenhart, Madden, and Hitlin 2005). This means that CMC is not only a familiar activity to this new crop of university language learners but also the preferred tool. Members of our profession need to harness these students' disposition to chat online in order to maintain interest in FL learning.

Let us now return for a moment to the educational advantages of increased access to instruction and other learners outside the normal constraints of the classroom via computer. Public schools, in particular, are faced with ever-increasing enrollment pressures, a veritable flood of baby-boomer children reaching college age: the U.S. Department of Education reports that enrollments increased 25 percent to 17.3 million students from 1990 to 2004, and it projects an additional 15 percent increase to 19.9 million students by 2015 (National Center for Educational Statistics 2006). It is doubtful that all of these students, or at least anyone who wants access to higher education, will find seats in a classroom setting as presently configured. Some L2 instruction in the future will have to take place at a distance or through what publishers call the home market. This does not diminish the on-campus/classroom experience; on the contrary, its value will appreciate even more, but access to that privileged learning format might not be available to everyone interested in language study. Likewise, as our nation slowly breaks out of its English-only dream (or nightmare), all kinds of learners will make known their interests in acquiring some type of L2 proficiency, whether to enter the global marketplace or, in the case of highly diversified states such as California or Florida, just to understand and get

along better with their neighbors. This new demand will be met by an aggressive response either from our language profession or by the more profit-minded publishing companies, or both. Most language professionals rightly feel that they should take the lead in determining the nature of instruction for this new and potentially significant audience. But will the language profession be ready to meet this challenge? Yes, but only if teachers start experimenting now with ways to enhance SLA through technology.

Many of the examples cited earlier have dealt most closely with the beginning and intermediate levels, the lower-division language curriculum. Why should these courses be of concern to literature professors who typically do not teach language—and sometimes, not even culture in an explicit fashion? If incorporating technology into the curriculum can stimulate—and even improve—the overall language preparation of those majoring in a language, then literature professors also have a vital stake in promoting technology. In reality, all undergraduate courses, whether examining Cervantes's novels, reading French symbolist poetry, or dissecting Chinese cinema, are language courses at their most fundamental level. (Remember that it takes four to six years to develop high oral fluency in a second language, according to the FSI's findings, without considering the additional demands of what is called "advanced literacy" or higher-order L2 reading and L2 writing skills.)³

Literature professors are often caught in a dilemma: Their language programs are too weak to prepare their students to read the original texts, but reading them in translation does nothing to further their students' L2 proficiency. The death knell of a foreign-language literature program begins to sound when all of the upper-division courses and their writing assignments are administered in English because the students are unable cope with the more sophisticated forms of literary registers. The blame for this situation must be spread around, and literature professors solely concerned with teaching content bear their share. Pressure from the dean to fill those upper-division courses with students can also be a motivating factor in offering Chinese Poetry in Translation or any other subject. No doubt these courses in translation play an important role for students' general education within the undergraduate curriculum, but if the entire foreign language curriculum switches entirely over to English as the medium of instruction, much will have been lost in the realm of cognitive development and humanities. There are significant cognitive benefits derived from learning a second

language. Scholars such as Kramsch (1993) have made it abundantly clear that the process of learning another language involves much more than just skill-acquiring and skill-using faculties. Learning another language also presents an opportunity for a critical interrogation of the very notion of culture, which is an appropriate upper-division activity in the liberal arts context (also see Kramsch and Anderson 1999).

In all fairness, colleagues teaching languages such as Chinese or Japanese, with complex writing systems, justifiably express anxiety and frustration with respect to these upper-division courses. These writing systems impose a steep learning curve above and beyond the normal challenges of achieving oral proficiency. All upper-division language courses critically involve advanced levels of literary proficiency, in addition to oral proficiency, which is not normally achieved by Japanese and Chinese children in their native countries until early adolescence. It is unreasonable to expect university language students to gain advanced literacy in just four, short years without active guidance from their professors. Knowing that these conditions result from the natural parameters imposed by the SLA process should assuage our colleagues' sense of disappointment and deflect the frequent cries of outrage over the issue of remedial language instruction; in other words, in the first four or five years of learning another language, nothing is remedial. Much cognitive progress is happening in these upper-division language courses, even if the content difficulty must be modified for the particular language and students in question.

Less commonly taught languages (LCTLs) often suffer from another curriculum dilemma: the need for quality pedagogical materials at all levels, which typically goes unmet due to low commercial profit margins at the publishing houses. Publishers project small enrollments for these languages and consequently have little motivation to produce print materials for them. Fortunately, new technological advances for web-based courses and CD-ROM applications offer language professionals the opportunity to create their own L2 materials that respond to the specific needs of their students. In short, a strong, technologically modernized language program will always be an advantage to all concerned in the department and will support a healthy major.

In addition, most institutions of higher education are affected by the prevalent student trend to gravitate toward courses that deal with either culture or language rather than literature. By offering an L2 culture course

supplemented by art or other forms of culture available in the form of web materials, language departments can recapture student interest. Extended class discussions via e-mail, listservs, or chat programs can further augment student interest as well as student-student and student-instructor interactions. In fact, Gonglewski (1999) has already laid out in clear terms how using technology can satisfy the demands of a curriculum based on the National Standards' (ACTFL 1996) five Cs: communication, cultures, comparisons, connections, and communities.

By the same token, it is important not to raise unrealistic expectations with respect to technology's possible contribution to the L2 curriculum. Negative reactions to the introduction of technology into the L2 classroom feed off the failed promises of the audio-lingual lab of the 1960s. Dashed expectations from that era have created a residual distrust of technology and account for many language teachers' reluctance to plunge into the implementation of any new technologies in the face of few demonstrable results (Roblyer 1988) and even fewer tangible career paybacks (Quinn 1990, 300; Garrett and Liddell 2004). To compound these initial suspicions further, many people have less than a clear notion of what technology means for L2 learning. Unfortunately, misconception about technology and language learning abound; some of these will be discussed in the next section.

FOUR MYTHS ABOUT TECHNOLOGY AND SLA

Four myths or misconceptions readily come to mind when the word *technology* is mentioned in language circles (also see Egbert, Paulus, and Nakamichi 2002; and Lam 2000): In the first place, some language professionals refer to technology as if it were a monolithic concept straight out of Stanley Kubrick's movie *2001: A Space Odyssey*. This myth suggests that technology is either all good or all bad—that is say, all technology is the same. Second, some teachers who are overly enthusiastic about technology subscribe to the misconception that technology itself embodies some new and superior methodological approach to language teaching, although, in truth, all the new digital technologies offer is a new set of tools that can function in service of the language curriculum with the correct application. In other words, how these tools are used and to what principled ends define

the scope of a methodology, but the mere use of technology by itself will not improve the curriculum. Third, all of us would like to believe (although we know better) that today's technology is sufficient for tomorrow's challenges. The fact that technology is constantly changing constitutes a frightening barrier for many language professionals who fear that they cannot possibly keep pace with new advances. Finally, the language profession suffers from the fear that technology will replace language teachers. Let's look more carefully at these four barriers to using technology in the FL curriculum.

Technology Is Monolithic

Have you noticed how people use the word *Internet* in an almost mystical fashion? "Ah, the Internet," they say, as if one word says it all. (A few years back, the magical term in our profession was CALL.) There isn't *one* technology best suited for language study, but rather there is an array of technological tools that can be harnessed, efficiently or otherwise, to the ends of learning a second language or studying the SLA process. Moreover, these technological tools change very rapidly.

More specifically, there are three important technological platforms that provide tools to assist language learning, in order of increasing interactivity:⁴ the web, CD-ROM or hypermedia applications, and network-based communication (i.e., e-mail, electronic mailing list, user groups, MOOs, chat programs, blogs, and wikis).

The web offers a variety of authentic target-language resources: a virtual trip to Peru, a guided bicycle trip to Santiago de Compostela, and a wine guide for La Rioja, the murals of Orozco, to name only a few examples for Spanish—but materials for Chinese, French, Italian, Japanese, and Russian abound as well, along with an ever-increasingly sophisticated array of web courses and self-tests. Teachers are beginning to use web pages, both original and adapted, to serve as the students' primary source materials, especially in content-based language courses. In this type of course, students work through the tasks and activities laid out before them and only gradually have recourse to learning the grammar (for a technologically supported, content-based approach, see Barson 1991; and Debski 1997). The web pages exist to provide content stimulation and a means for further inquiry. Given the richness of

non-English web materials, the class can move in new directions at any point or deepen their knowledge of any particular topic. For the experienced teacher who knows how to take advantage of these obvious communicative opportunities, a web-based, content-driven approach is a dream come true—and the students respond in kind. Something like this type of web-based course might eventually displace the notion of a static textbook, copyright problems notwithstanding. These issues are more fully explored in chapter 2.

The CD-ROM and DVD platforms were designed to deliver specific applications that take advantage of large amounts of sound, graphics, and video files. The publishing industry is increasingly involved in producing high-quality CD-ROMs and DVDs because the marketplace is demanding it.⁵ One of the jobs of today's language faculty and lab personnel is to keep track of this new generation of language CD-ROMs and DVDs and to know how to review them, which is a catch-22 in itself: Language professionals need to know something about interface design and computer pedagogy in order to be able to review software in the first place. Teachers must be trained to recognize well-grounded pedagogy when they see it, hear it, and read it on the screen. Many of today's CD-ROMs have sophisticated visual interfaces, but one has to be careful that the medium does not dominate the message, to borrow a phrase from Marshall McLuhan (1964). The benefits offered by these platforms will be more fully examined in chapter 3.

Finally, CMC provides a third platform where L2 students can transcend the spatial and temporal confines of the classroom via the Internet. E-mail or asynchronous (i.e., differed-time) communication and chat or synchronous (i.e., real-time) communication offers students the highest level of interactivity because they permit one-on-one, personal exchanges. SLA research has clearly demonstrated the importance of learning language through face-to-face exchanges that require the learners to negotiate meaning with other learners and/or native speakers (Pica 1994; Long 1981, 1991; Gass 1997; Gass and Varonis 1994; Doughty 1998; Blake 2000, 2005a). When asked to negotiate meaning, L2 students are forced to notice what they do not know and, subsequently, seek a resolution to their linguistic or cultural misunderstanding before resuming the free flow of dialogue. This process of mutual assistance, what many researchers refer to as scaffolding, appears to be one of the principal ways in which students gradually liberate themselves from a seemingly interminable and ever-changing period of in-

terlanguage, the interim stages of a learner's emerging L2 linguistic system, in pursuit of more advanced proficiency in the target language.

Students can carry off these negotiation events during regularly scheduled class time or lab sessions, but the benefits of negotiating meaning can also be obtained through synchronous network-based communication (Pellettieri 2000; Blake 2000). This means that students can engage in negotiating meaning anytime from home or the lab. This use of technology opens the door to an untapped potential for L2 language use. Again, all theorists agree that increasing the amount and quality of the students' L2 input (with output, too, even better) is crucial to SLA success. CMC has an enormous contribution to make to the L2 curriculum, if teachers will become familiar enough with the technology to be able to incorporate it into the students' out-of-class assignments. Chapter 4 discusses this topic in more detail.

Technology Constitutes a Methodology

No SLA theory has anything to say directly about language teaching; the field's principal goals consist of studying the process of how languages are acquired, not how they are taught. Nevertheless, particular teaching methodologies (e.g., total physical response [TPR], the Natural Method, or the communicative classroom) necessarily attempt to make the leap between theory and practice by identifying the most favorable conditions for L2 learning. In an ideal world, then, a methodology should be informed by what is known about the nature of the SLA process:⁶ for instance, claims such as "all L2 learning requires comprehensible input, or better yet, intake." Technology, *per se*, has no stake in any particular theoretical model or teaching methodology: The technology is theoretically and methodologically neutral. But how technology is used—its particular culture of practice—is not neutral; it responds to what the practitioners understand or believe to be true about SLA. Teachers inexperienced in using technology often harbor the belief that merely transforming an activity into a web or CALL format will guarantee its success for students. Again, any activity without adequate pedagogical planning—technologically enhanced or not—will produce unsatisfactory results with students, even if it's attractive from a multimedia point of view (e.g., colors, graphics, photos, video, sound).

Many teachers feel that the only curricular role for technology is to relieve the teacher of the more burdensome aspects of testing and rote drills, so that classroom time can be fully utilized for communication. For example, in the past the Spanish and Italian programs at the University of Illinois have employed a web-based program called Mallard to free up the maximum amount of classroom time for communicative activities and to justify the decrease in the course's seat time requirements from five to three hours a week (for more information and evaluation of Mallard, see Arvan and Musumeci 1999; Echávez-Solano 2003; Epps 2004; Scida and Saury 2006; and Walczynski 2002). The research has shown that there are no significant differences in final grades among the experimental (Mallard) group and the control group, with Scida and Saury's (2006) study registering slightly higher final grades for the group using Mallard. Researchers attributed much of the student success with the Mallard program to the students' ability to continue working on the exercises until reaching 100 percent accuracy. In essence, the availability of the tutorial CALL program appears to have allowed students to dedicate more time to making their control of the basic language structures more automatic.

In practical terms only, programs such as Mallard allow teachers (i.e., teacher's assistants or TAs) to handle more students with the same number of faculty/TA resources. Naturally, the administration is delighted with this increase in the student/teacher ratio. Likewise, some teachers are happy to not have to bother with morphologically based drills and tests during precious class time, which goes against the theoretical bent of the communicative classroom, and the students enjoy increased access for completing the language requirement. This appears to constitute a win-win situation for all concerned and an appropriate use of technology for these programs. Other institutions may wish to explore different solutions, depending on their respective expectations and theoretical orientations.

Today's Technology Is All We Need to Know

Constant change is a frightening phenomenon for most people, but that is the inherent nature of the technology field: New tools are being created all the time. As Hanson-Smith (2006, 301) observes: "One of the most significant problems facing computer-using teachers is that no education curriculum

can prepare them for the swift and continuing changes that take place in the world of technology." To cope with the field's intrinsic flux, language programs need long-term institutional support, both from the campus information technology services that are delivered locally in the form of a designated language lab and through a collegewide humanities technology-resource person. It should be patently obvious that technology rarely helps anyone save money. In most cases, it engenders more financial commitment, at least at the beginning. Nevertheless, new technologies allow an institution's human resources to work more efficiently and can provide greater educational access for students, along with offering new channels for learning. New advances in technology allow an institution's personnel to do new things and therefore represent a catalyst for change.

Accordingly, working with technology requires constant updating and continuing education, which can be a very threatening concept for language professionals who are used to concentrating on teaching to established standards (i.e., keeping performance level constant) and achieving dominance of the more literary and prestigious registers of their respective world language. The often-repeated joke holds true for language faculty: "How many professors does it take to change a lightbulb?" The punch line comes from the faculty's own response: "Change?"

In all seriousness, this situation conjures up a natural conflict of interest from which language professionals are not immune. It should come as no surprise that the vertiginous pace of technological changes is responsible for considerable resistance to implementing technology into the L2 curriculum. "Who has the time for that kind of an investment," some teachers might intone. Yet there are other, more powerful fears that stand in the way of using technology: "Will technology replace the teacher or the courses in the department?"

Technology Will Replace Teachers

Put bluntly, some in our profession fear that the use of technology will replace them and the courses they teach, especially when mention is made of completely virtual online courses (i.e., distance language learning; see chapter 6). Their fears are frequently fed by administrators who openly seek

budgetary savings through downsizing the extremely labor-intensive language programs. In this mad rush, everyone seems to forget to answer the questions of who will teach those distance learning courses, write the curriculum, and train students to work within this format.

The technology platforms I have mentioned earlier—the web, CD-ROM/DVD, and CMC—do not pose a threat to language professionals but rather complement what can be done in the L2 classroom, if used wisely. Will technology expand in the future from this complementary role to replacing the teacher and the classroom venue completely? A rational response to this question might be that technology will not replace teachers in the future, but rather teachers who use technology will probably replace teachers who do not (Clifford 1987, 13). Again, this implies hiring new faculty with at least a modicum of technological expertise, along with implementing training programs for the existing faculty so that they can come up to speed with new advances. In this context, it is easy to see why many language professionals might eschew the introduction of technology into the L2 curriculum by fiercely adhering to Newton's second law of motion that says that bodies at rest tend to stay at rest.

What I am advocating here by debunking these common misconceptions is a more realistic assessment of what technology might do for a particular institution's language curriculum. Nothing is achieved by promising the language profession a panacea for its financial and curricular woes, although many administrators would dearly like to downsize language departments using technology as a replacement. Computer technology will be a key component to most everything accomplished in the twenty-first century. The language profession needs to capitalize on its advantages and strengths by using the best teaching practices, which, in turn, should be informed by SLA theory whenever possible. By resisting the temptation to believe in the four myths outlined earlier, language teachers and administrators help open their minds to observe and contemplate instances in which technology constitutes good teaching practice. Again, teaching practice should not be totally divorced from theory (although theorists may have no interest in practice).

<i+1> AND BEYOND: SLA THEORIES AND TECHNOLOGY

No general discussion of technology within the context of language teaching would be complete without a brief overview of current SLA theories. Again, the process of how a language is acquired should be kept distinct from best practices for language teaching. But it would be an unnecessary fiction to maintain that methodologies are not informed, correctly or not, by SLA theories and models.

The intent here, then, is not to explain in detail the various SLA theories and their histories; there are a number of introductory books that already meet this need (e.g., Doughty and Long 2003a; Ellis 1994, 1997; Gass and Selinker 2001; Gass 1997; Larsen-Freeman and Long 1991; VanPatten 1996). But the various SLA theories suggest differing degrees of importance concerning the role of instruction/practice and, by implication, the use of technology in the classroom. Technology, as defined earlier, is a series of electronically based platforms and tools that support many language learning activities, from the most mechanical drill-and-kill exercises to fully communicative real-time conversations (i.e., *chat*). Language professionals need to have an adequate theoretical background in order to decide when a particular tool might assist the students' linguistic development. Like the field of linguistics itself, SLA studies emanate from two distinct, but not necessarily incompatible, approaches: one that focuses attention on the psycholinguistic aspects of SLA and the other on the sociolinguistic aspects.

There is no denying that the recent interest and popularity of SLA studies owes much to Chomsky's psycholinguistic or mentalist inquiries into the nature of language, which has revolutionized the field of linguistics. Chomsky postulates that all children are innately predisposed, if not prewired, to learn language; the individual child only requires a sustained exposure (i.e., input) to one particular natural language in order to trigger the formation of an internal grammar or mental representation of linguistic competence that, in turn, governs language production or performance. According to Chomsky, this grammar-building process—known as *LAD*, the *Language Acquisition Device*, in his first theoretical formulation—is constrained by universal properties common to all languages (Chomsky 1986, 3). Through exposure to the rich linguistic input or positive evidence contained in the well-formed

sentences of native speakers in the environment, the child develops all the other language-specific constructions as well. In short, language performance is a rule-governed activity generated by the child's linguistic competence or internal grammar. The occasional slips of the tongue, false starts, and memory lapses, which are part and parcel of performance, are of little importance to the linguist, who seeks to discover the underlying structures and constraints that pertain to competence, the universal core of language that makes language acquisition possible in the first place.

Krashen (1982, 1985) embraced Chomsky's ideas and adapted them to the SLA field by highlighting the role of input. But, at the same time, Krashen recognized that SLA is governed by special conditions different from first language acquisition: namely, L2 learners need input that is both challenging and assessable; they need *comprehensible input* that is within their grasp, input just slightly more complex than their current, still emerging, mental representation of the target language, or what researchers have called their interlanguage (Gass and Selinker 2001, 11). Krashen symbolized comprehensible input and its scaffolding relationship to acquisition by means of a mathematical metaphor, where i stands for *interlanguage*: $<i+1>$, input that pushes L2 learners to restructure their interlanguage without overwhelming them with data well beyond their present capabilities. Although the $<i+1>$ metaphor is somewhat dated now, given that other researchers have refined the notions of input considerably (see following discussion), Krashen's impact on the FL teaching field has been definitive. The linguistic portion of most teaching credential exams still tests Krashen's ideas almost exclusively. Likewise, most beginning FL textbooks make at least a cursory reference in their introductions to the need to present students with comprehensible input, an idea taken directly from Krashen. For this reason, I will elaborate further on Krashen's model.

Similar to Chomsky's explicit distinction between competence and performance, Krashen makes a clear distinction between the process of acquisition and that of learning. He emphasizes the subconscious nature of acquisition (i.e., competence) in contrast to the students' more conscious attempts to manipulate and learn linguistic forms (i.e., performance). Conscious learning involves monitoring and practice, but acquisition entails a change in the internal representation or competence that eventually happens with enough exposure to $<i+1>$ input. For Krashen, learned or monitored knowledge has

no relationship to acquired knowledge; they are separate systems of knowledge. Other researchers (McLaughlin 1987; Gregg 1984; Swain 1985; Salaberry 1997; Ellis 2002) have argued for interrelationship between controlled processing (i.e., learning or monitoring in Krashen's terms) and the subsequent development of automatic processing, or automaticity (i.e., acquisition). In other words, after L2 learners have consciously practiced an item for a long time and no longer need to focus consciously on the structure to produce it, their responses become automatic—with the latter type of knowledge presupposing the former. With this new emphasis on more cognitive issues has also come a renewed interest in how L2 students make sense of new vocabulary, lexical chunks, and collocations in contrast to Chomsky's almost exclusive focus on formal syntactical representations as an independent and controlling module of the brain (Ellis 2002).

Krashen complements this central role assigned to comprehensible input with the sensible recognition that learning anxieties can block language acquisition for all intents and purposes. These anxieties erect an *affective filter* that reduces the students' ability to make use of comprehensible input and subsequently blocks interlanguage development. The implications he draws for the classroom should be obvious: mechanized language drills might produce some learning of forms, but the real goal of acquisition is best fostered by a communicative environment rich in comprehensible input. The communicative classroom, in addition to providing lots of comprehensible input, should also create an inviting atmosphere with an eye to lowering the students' affective filters.

Krashen's SLA model, while neither uncontroversial nor unchallenged (see Gregg 1984; Lantolf and Frawley 1988; Gass and Selinker 2001, 148–52), has had an enormous impact on classroom practice, being most closely identified with what is known as the Natural Method (Krashen and Terrell 1983). In fact, today's varied communicative approaches to language teaching all have roots in Krashen's ideas. The implementation of Krashen's theory, however, places a heavy burden on teachers to provide large amounts of comprehensible input. In other words, the theory tends to reinforce a teacher-oriented classroom, albeit one in which much language communication is happening.

Setting aside for the moment the intractable—if not unsolvable—problem of determining just what constitutes comprehensible input (i.e.,

$i+1$) for any particular L2 learner, let alone for a whole classroom of learners, the question arises as to who is to blame if the students fail to learn or progress too slowly. One interpretation would suggest that teachers have failed to provide a learning environment rich in $<i+1>$ input. But it is equally plausible that the students were unable to process crucial segments of the comprehensible input because of short-term memory problems, failure to notice certain linguistic structures, or other as yet unexplained reasons.

This is precisely what other SLA researchers have pointed out: The existence of comprehensible input in any L2 learner's environment (classroom or otherwise) does not guarantee its usefulness for SLA. Unnoticed comprehensible input is as useless as input well beyond the learner's present level of competence or interlanguage. Only when L2 learners actually notice a particular unit of input—a process that Gass and Selinker (2001, 298) have dubbed *apperception*—and can also retain that information in their short-term memories, does it become intake, or internalized input that can be used to help restructure their interlanguage grammar in more targetlike ways.

The role of consciousness and negative evidence is crucial to this revised SLA input model. L2 learners must first notice the gap between the available input and their own interlanguage (i.e., *apperception*) before they can develop more targetlike ways of communicating: "The first stage of input utilization is the recognition that there is something to be learned, that is, that there is a gap between what the learner already knows and what there is to know" (Gass 1997, 4). This implies that L2 learners must develop their own metalinguistic awareness—that is, a new sense that something is incorrect in their own knowledge of a second language—to stimulate a change in their interlanguage (Schmidt and Frota 1986, 306–19; Schmidt 1990).

The theoretical focus has now moved away from an examination of comprehensible input more in favor of a study of comprehended input, combined with an increased emphasis on the more social aspects of the SLA process. L2 learners discover these gaps in the course of normal communication, especially when miscommunications occur causing a breakdown in the conversational flow of information. In repairing these breakdowns through negotiations with native speakers (NS) or other non-native speakers (NNS), L2 learners tend to focus on the gaps in their linguistic knowledge. This SLA approach constitutes an interactionist model because interactionists believe that a second language is best learned—and by exten-

sion, best taught—through social interaction (Long 1981, 1991; Pica 1994; Gass 1997; Doughty 1998).

In contrast to the psycholinguistic approach, which highlights the role of positive evidence for SLA, the interactionist approach focuses on the importance of miscommunications and instances of negative evidence generated by the L2 learners' attempts to negotiate meaning with counterparts in their social (i.e., learning) environment. Miscommunications that lead to conversational negotiations either of meaning or form serve as a catalyst for change in L2 learners' linguistic knowledge, as described by Gass (1997, 87): "Through negotiation of meaning learners gain additional information about the language and focus their attention on particular parts of the language. This attention primes language for integration into a developing interlinguistic system."

Learners who are provided with information about incorrect forms are able to search for additional confirmatory or nonconfirmatory evidence. If negotiation as a form of negative evidence serves to initiate change, the factors that determine whether the initiated change results in permanent restructuring of linguistic knowledge must be identified. As with any type of learning, there needs to be reinforcement of what is being learned. In other words, acquisition appears to be gradual and, simplistically, takes time and often requires numerous doses of evidence (Gass 1997, 144–45). The interactionists are careful not to claim that negotiations of meaning cause SLA to happen but rather that these interactions are a priming device that allows learners to focus their attention on areas on which they are working (130).

A more practical instantiation of the interactionist approach is known as a *focus on form* (*FonF*; Long and Robinson 1998), a task-based methodology that calls on L2 students to solve specific tasks. As students collaborate on these tasks with other L2 learners or other NS, they focus on the source of their linguistic confusions (e.g., vocabulary, morphology, syntax), negotiate their incomplete understandings, and, consequently, analyze their own language.

In this approach, not only input, intake, and uptake but also output—forced output, to be precise—are important. Swain (1985, 2000) outlines three potential functions of output: (a) it provides the opportunity for meaningful use of one's linguistic resources, (b) it allows the learner to test hypotheses about the target language, and (c) it encourages the learner to

move from semantic to syntactic processing. Swain argues that comprehension of input is a process driven by semantics; in other words, learners do not always need to parse the sentences they hear in order to arrive at the intended meaning. Production, conversely, requires the learner to utilize syntax in order to produce coherent, meaningful utterances. When a learner is pushed during output, he or she is encouraged to convey meaning in a precise and appropriate manner. This momentary “push” may be critical for language acquisition, because it promotes noticing (Swain 2000, 100): Learners may notice that they do not know how to express precisely the meaning they wish to convey at the very moment of attempting to produce it—they notice, so to speak, a “hole” in their interlanguage.

Finally, Krashen’s exclusive emphasis on input led the FL profession to eschew any type of explicit linguistic explanations; for example, the Natural Method prefers to rely only on implicit forms of instruction. The FonF studies, along with other lines of inquiry, have reaffirmed the role that explicit instruction might play in the SLA process (MacWhinney 1997; Ellis 2002). This marks a significant change in attitude concerning the computer, a tool that can be used particularly well in support of explicit language instruction.

SLA THEORY, INTERACTIONS, AND THE COMPUTER

Most computer programs minimally do something in response to mouse clicks, data entry, or other keyboard actions: they beep, show a picture file, move to another screen, play digital sounds, or the like. These minimal computer reactions often constitute the sole basis for commercially labeling the program as interactive. How does this sense of the word fare against the more social and interactionist definition described earlier? For the interactionists, L2 learners are motivated to learn new structures by being incited by other speakers to use the target language. In fact, for many language professionals technology might represent the antithesis of what learning a second language should be all about: talking to and interacting with real *people* in the target language.

Nevertheless, the computer’s obvious failings as a person (including Kubrick’s infamous computer HAL from 2001) are relatively unimportant in the face of how people work with computers. As mentioned earlier,

Reeves and Nass (1996, 5) have shown that people have a strong tendency to interact with computer machines in a fundamentally social manner, just like interactions in real life. These social scientists argue for the existence of a media equation where media can equal real-life experiences. For example, if a computer program addresses users in a polite fashion, then the users will respond politely as well, even though they know in purely intellectual terms that a machine has no feelings. According to Reeves and Nass, programs that capitalize on the media equation usually solicit more favorable reactions from computer users than programs that ignore the media equation. In other words, L2 learners conceive of the computer as their own personal helper rather than the mindless, heartless tool that it really is. This inherent tendency to anthropomorphize our world—from our cars to our pets—persists and gives technology its potential to assist the SLA process. People think computers are trying to help them and respond, as in any human relationship, by making a best-faith effort to cooperate.

Good interface design builds on this fiction. It is not necessary for computers to be human but only to simulate certain human qualities. Above all, people count on computers to follow basic Gricean principles (Pinker 1994 [1995], 228): namely, that the information supplied is relevant, truthful, informative, clear, unambiguous, brief, and orderly. This is especially true if programs can be designed to intervene or provide feedback that is well suited or relevant to the particular user's needs. Fogg (2003, 38) calls this the principle of tailoring: "Information provided by computing technology will be more persuasive if it is tailored to the individual's needs, interests, personality, usage context, or other factors relevant to the individual." Fogg (69–70) also formulates two other principles of virtual rehearsals and rewards, which states that positive reinforcement or rewards received from computer programs can cause human beings to rehearse behavior with a carryover in attitudes and conduct to the real world. In a word, people expect good input from the computer and therein lies its power to help students learn.

QUO VADIS?

We have come full circle from the outset of the chapter. Input, especially comprehended input, is one of the basic cornerstones of current SLA theories:

Without input, SLA can't occur; it is a necessary condition but not the only one—it's not a sufficient condition. Technology, then, if cleverly designed and properly implemented into the curriculum, has a vital role to play in augmenting the opportunities for L2 learners to receive target-language input. Again, the learners' contact with the target language is a critical factor for the SLA process, which normally takes five to seven years under classroom conditions, as most FL professionals working in the trenches already know.

An increasingly multicultural world in global and local contexts will put intense pressure on our profession to find the most efficient and readily accessible ways to learn another language. To that end, using technology is a challenge that language professionals must squarely face and to which they must endeavor to find pedagogically principled responses. Theory must be combined with practice, which will not happen without our colleagues' willingness to experiment with the newest modes of teaching with technology. While FL teachers and students alike need to acquire a basic degree of functional computer literacy, they must also learn to exercise a critical literacy as consumers of technology and, eventually, a rhetorical literacy as future producers of technology (see Selber 2004 and further discussion in chapter 6). In other words, Dreamweaver, chat applications, blogs, wikis, JavaScript, or any other tricks of the trade are just a beginning that opens the doors to more student-directed activities and the L2 student's journey toward self-definition and identity as a multilingual/multicultural speaker, quite apart from whatever identity may be attributed to the ubiquitous but anonymous native speaker.⁷

In the following three chapters, I look closely at three platforms—the web, CD-ROM/DVD programs, and CMC—always with an eye to establishing what a basic, functional computer literacy should be, and then looking forward in the true humanistic spirit to both a critical and rhetorical literacy as well. In chapters 5 and 6 I put all the tools together to suggest how the new technologically assisted curriculum will work in both a distance learning and a classroom context and what research issues remain to be examined.

DISCUSSION QUESTIONS AND ACTIVITIES

1. What are researchers in SLA referring to when they speak of L2 competence versus L2 performance and L2 acquisition versus L2

learning? Can performance be separated from competence? Into which category would L2 pragmatics fall (i.e., the knowledge about the appropriate situational context for words, utterances, and meanings)?

2. Imagine that you have to convince your colleagues, who are mostly interested in literature, to make an investment in using technology for the FL curriculum. List five reasons why it is also in their interests to support your plan. Consider scientific as well as social reasons that provide an incentive for your department's investment in technology.

3. What would you say to your colleagues in order to ease their worries that investing in technology will not eliminate language-teaching jobs?

4. Discuss whether it is a problem or an advantage for language teachers that this generation of incoming students will most likely know more about using certain technological tools than they do.

5. Conduct a web search for the following theme: language teaching with technology. Share your results with a colleague or classmate.

6. Debate which aspects of Krashen's theories about SLA are well grounded and which are not supported given recent advances in the SLA field.

NOTES

1. SLA theorists often make a distinction between foreign language acquisition, where instruction occurs in a place in which the target language is not spoken, and second language acquisition, where instruction occurs in a target-language speaking country. Throughout this book I use the term "second language acquisition (SLA)" to refer to both circumstances indiscriminately.
2. These figures are taken from the report listed at www.translate-to-success.com/online-language-web-site-content.html.
3. Cummins (personal communication) estimates that five to seven years are needed to reach academic proficiency on the English CALP exam, a figure quite consonant with the FSI's experience in teaching second languages.

4. *Interactive* is a loaded term nowadays. It has come to mean any program that includes user-responsiveness, but, in fact, true interactivity supports reciprocal actions (Laurillard 2002, 107). Only CMC (see chapter 4) can truly be said to provide that level of interactivity.
5. See the special issue of the *CALICO Journal* 17, no. 2 (2000).
6. Our knowledge of SLA still remains quite modest, as Richard Schmidt has characterized in a recent talk at the University of California, Davis, April 2005, in terms of “Fifty (probably) true and (possibly) useful findings from SLA.”
7. Kramsch (2000) has written extensively arguing against the construct of NS, especially as the desired endpoint for the L2 learner.