

The Innovative Sony ZL-10 Learning Laboratory: Creating Tomorrow With Today's Digital Voice Memory

Imagine yourself at a national language conference. After listening to a dozen presentations, you find yourself escaping to the Exhibit Hall. As you shuffle down the crowded aisles, you stop at the Sony booth and watch a demonstration of something called the ZL-10 language laboratory system—very small, very sleek, and very digital. Like the man many years ago who found himself standing next to then U.S. Ambassador Benjamin Franklin as both witnessed the first balloon flight over the city of Paris, you, too, find yourself wondering, “What possible good could such a thing be?” If you were able to ask Benjamin Franklin, he would counter, “What possible good can the ZL-10 be? What good is a newborn baby?”

It was only a matter of time before language laboratory technology went “digital,” and it is not surprising that Sony—the one and only—would be the first to package it in the ZL-10 configuration.

For many of us, “digital” is something we’ve seen crop up during the past several years on our videocassette recorders (VCRs) in the form of digital features: 1) digital zoom which permits us to expand a video image in order to “blow up” a specific portion of it; 2) digital quad-zoom which divides a picture into four images with a fifth image in the center, expandable to four times its original size; 3) multi-image digital wizardry which can place up to 100 pictures on a single screen; and 4) digital special effects such as fine slow-motion, strobe, solarization, mosaic, picture-in-picture (PIP), digital noise reduction, and quick random access. If we don’t rush right

out and buy a JVC HR-D630U, or a Sony SL-HF860D, or a Mitsubishi HS-U80 digital VCR, perhaps, even the most skeptical and jaded among us would have to admit to being suitably impressed with what digital features allow us to achieve with our VCRs.

Although we may be suitably impressed with digital technology in our VCRs, some of us in foreign and second language education who are charged with teaching students how to become communicatively competent in foreign and second languages may remain skeptical about digital technology in language laboratories. Like the man watching the first balloon ascend over Paris, we, too, wonder what could teachers and students possibly gain from using an innovative language laboratory system which uses digital voice memory. Before we can make an informed assessment about what teachers and students can gain from language laboratory systems built around digital voice memory, we need to know something about them.

Look, Ma, No Tapes

Much like the Protestant Reform enlisted the interests of religion in the service of instruction—associating knowledge with faith—technology vendors enlist the interests of technology in the service of profits. Whereas poets may see the world in a grain of sand and eternity in an hour, today’s technology vendors see profits in associating the existing and emerging information technologies—originally developed for the commercial and consumer markets—with

education, thereby hoping to realize revenue from the largely untapped education market.

When it comes to digital voice memory, many of us have used it, perhaps, without even knowing it. At Disney World, we may have used it to quickly access information at the many exhibits, or when travelling, we have used it at the Atlanta Airport to remind ourselves that "the train is leaving the station; please stand away from the doors."

Although the ever-hopeful among us are waiting for a time when the tail will not be wagging the dog, that is, when technology is developed in response to pedagogy, digital voice memory in the format of the ZL-10 is another example of a classic "hand-me-down" technology, albeit very small, very sleek, very digital, and very much the way of the future.

The first thing that strikes anyone looking at the ZL-10 is, perhaps, its most futuristic and innovative feature, namely the absence of tape. This language laboratory system, unlike all other systems, does not use tapes to store and send out master programs and student responses; it stores and broadcasts via a different means, that is, by the RAM (Random Access Memory) built into the control unit. By adopting an Integrated Circuit (IC) voice memory for program storage and distribution, Sony has created features in the ZL-10 that enable it to function in ways not possible with tape-recorder-based language learning systems no matter how advanced and refined. The ZL-10's unique functioning revolves around its quick random access capability and the playback mode variations created by this capability.

Whole Lotta Quick Accessing Goin' On

Since the master program is digitally stored into the voice memory of the control unit—sentence by sentence—each sentence can be played back from the beginning to end without the additional recording of cue tones or intervals. Using the following method (in order to identify a sentence), the ZL-10 detects the blanks between sentences when a program is loaded into the voice memory: The voice memory starts to load the program when the audible part of the program continues for **68 milliseconds**. The actual loading begins 500 milliseconds prior to the load

detection point in order to assure that the program is recorded. However, **if the audible parts of the program to be loaded are less than 68 milliseconds, the voice memory does not load such sounds of shorter duration**. Furthermore, should intervals between sentences be shorter than one second, the ZL-10 regards the two sentences as one consecutive one. To separate them for playback, it is necessary to activate the "Separate" switch on the Teacher Control Unit.

By not recording pauses, a 15-minute program can be compressed to about 6 minutes. Played back in the Insert Pause Mode, the ZL-10 generates intervals, inserts them between the sentences, and the 6-minute compressed program will once again "expand" to its "normal" 15 minutes during playback. In addition, because searching is performed electronically without the need to fast-forward or rewind tape, access time is significantly shortened.

This sentence detection method is not operative when the Student Unit records student responses. In the case of student voice recordings, **each student can make a recording of a maximum of 8 seconds after pressing the drill-record switch regardless of audible and silent portions**.

Digital Recording Enables Quick Random Access. The voice memory of the ZL-10 digitally records the program and student responses. Using the Adaptive Delta Modulation method, a kind of Pulse Code Modulation (PCM), the ZL-10 converts A/D (analog to digital) and D/A (digital to analog). Programs and voices are sampled by a frequency of 64kHz. The difference of the sampled value is expressed by 1 bit (0 or 1). It is in the variable quantization step between the sampled values that the Adaptive Delta Modulation method achieves a more natural sound reproduction as compared with ordinary delta modulation methods. The A/D and D/A conversion is performed by the Student/Teacher Units of the ZL-10 with transfer between Teacher/Student Unit and the Control Unit occurring at a bit rate of 64k bit/sec. (8 bits, 8kHz).

The voice memory has only one doorway to exchange information with the terminals (Student/Teacher Unit). As a result, each terminal is allowed access to the voice memory

one by one as determined by a given priority. From the perspective of the terminal, information is sent from the voice memory once within every frame thereby setting **the maximum number of students who can access the voice memory at the same time at 64**. Furthermore, *each student position subtracts 8 seconds of the total storage time of the system.*

SYSTEM COMPONENTS AND ACCESSORIES

The ZL-10C1/C2 Control Unit

The ZL-10 offers a choice of two different Control Units for the system, the **ZL-10C1 with 32 min. 16 sec. of total storage time** (which includes the 8 seconds recording time by students) and the **ZL-10C2 with 15 min. 16 sec. of total storage time** (which includes the 8 seconds recording time by students). With a total storage capacity of 32 min. 16 seconds, the ZL-10C1 if configured with 30 student positions, has 28 min. 16 seconds of total program memory time; if configured with 48 student positions, total program memory time is 25 min. 52 seconds; and, if configured with the maximum 64 student positions, total program memory time is 23 min. 44 seconds. The ZL-10C2 version—with 15 min. 16 seconds of program storage time—when configured with 30 student positions, has only 11 min. 16 seconds of storage; configured with 48 student positions, it has 8 min. 52 seconds of storage; and, if configured with the maximum 64 student positions, it has 6 min. 44 seconds of total storage time.

In addition to containing the voice memory to store the program and student responses, the Control Unit supplies power to the entire system. The entire system consists of two master recorders, one teacher unit, and a maximum of 64 student positions.

In order to connect student units to the control unit, the ZL-10J1 is required. A 3 meter cable, the ZL-10J1 connects two student units, and up to six ZL-10J1s can be connected in a row. Requiring only DC 12V supplied from the control unit, this joint unit consumes 12V 100mA, weighs approximately 1 lb 2 ounces, and its joint box is approximately 3.9 x 1.2 x 2 inches. In order to connect the ZL10J1 to the Control Unit, the RK-7080/7110 connecting cable is required. The

RK-7080 is 26' 3" in length and the RK-7110 is 36' 1" in length.

ZL-10S1 Student Position

Quick Random Access. Although the operation of the student unit is quite similar to those of traditional student controls, especially those that are associated with the so-called remote language laboratories where the actual tape recorders are located in one area while the student controls them by means of a control pad from another, the use of RAM in the ZL-10 system permits students to gain quick random access to program materials; they are able to make the program start, stop, repeat continuously, return to the beginning or end—all with the minimum of time. For self-study, students can access any part of the program, any time, without interfering with other students using the system simultaneously.

Audio Active Comparative Instruction. Although each student can record his or her voice and compare performance with a master sentence, the student's recording is played back **after** the model sentence, and length of a student's recording **is always limited to a maximum of 8 seconds**. By connecting an optional tape recorder to the jack provided on the ZL-10S1, the student can make recordings for his personal use or home study, provided such recording is not in violation of copyright.

Sleek, Silent, Compact. Because of the incorporation of RAM, the number of mechanical parts and devices in a system such as the ZL-10 has been significantly reduced, and the reliability of systems with fewer mechanical parts is thought to be higher. Without tape recorders and mechanical controls, the SL-10S1 touch-pad control unit is very quiet, compact, and field repairable, having only 3 screws to hold it together.

Specifications. Weighing about 14 ounces, the ZL-10S1 has the following dimensions: approximately 12 x 1.4 x 2.7 inches. It consumes DC 12V, 50mA of power which it gets from the DC 12V supplied from the control unit. In addition, the ZL-10S1 has the following input/output connectors: Data transfer & power supply: 8-pin Mini connector x 1; Headset x 1:

Mic. input -54dB 600 ohms ECM; Output: H -20db, M -25dB, and L -30dB; Monitor output: Mini jack x 1, 8 ohms (H -23dB, M -28dB, and L -32dB).

HS-95 Headset

The HS-95 headset is familiar to many users of some of Sony's other language laboratory systems. Utilizing an electret condenser microphone, it is also the headset recommended for use with the ZL-10 system. Lightweight at approximately 7 ounces, the headset plugs into the Student Control Unit by means of a twin-pin plug.

ER-4041 Master Recorder

Required to store programs into the ZL-10C1/C2 Control Unit (although other external audio sources can be used), the ER-4041 uses a 1 chip Central Processing Unit (CPU) to assure smooth and accurate operation. With 1 Record/Playback head and 1 erase head, the ER-4041 has a 4 track/2 channel track system. Weighing approximately 4 lbs 5 ounces, this recorder has a signal to noise ration of 52dB (A), frequency response of 50Hz-10kHz, and wow and flutter at 0.09% WRMS. The input level of the line in is -5db 47k ohms and the output level of line out is -5db 47 ohms. Overall recording bias frequency is 105kHz.

LD-10CT1 Desk Assembly

To house the two master recorders, the one teacher unit, and the one control unit of the ZL-10 system, Sony offers a desk assembly which weighs approximately 78 lbs 11 ounces and has the following dimensions: 41.3 x 27.6 x 31.4 inches. Made of metal and pressed wood, the assembly has the familiar blue, black and beige of current Sony learning laboratory accessories.

BA-7020 Booth Assembly

Offered in a two-student unit, this flat type booth assembly looks rather like a good-sized table with metal, L-shaped legs, to which the ZL-10S1 student units can be affixed. Weighing approximately 52 lbs 4 ounces, the unit has the following dimensions: 59.1 x 28 x 18.6 inches.

LSP-55 Room Speaker

A 6.5 inch diameter, one-way full range speaker, the LSP-55 has a power handling capacity of 25W and an output sound pressure level of 88dB (1W, 1m).

ZL-10T1 Teacher Unit

Because this unit has command over the entire ZL-10 Learning Laboratory System, it controls loading, editing, and distribution of programs. In addition, from this unit, the teacher can make use of other frequently used learning laboratory functions found on many language learning systems: Call/Intercom, Pairing (adjacent/random), Model Voice (maximum of 2 students), and Monitor.

Playback Variations. Because the use of the RAM permits the adjustment of intervals and the playback order of the original program, the RAM also dictates what kind of playback is possible. In the case of the ZL-10, after a program has been stored or loaded into the control unit, it can be played back in five variations: 1) the program can be played back in the **NORMAL** mode, that is, in its original form; 2) the program can be played back in the **INSERT PAUSE** mode, that is, with intervals inserted between sentences—each interval being exactly 1.2 times the length of the previous sentence; 3) the program can be played back in the **PAUSE CUT** mode, that is, all intervals between sentences are adjusted to be 1 second in length; 4) the program can be played back in the **PERSON CUT** mode (a better label for this mode would be **SENTENCE CUT**), that is, only every other sentence is played back; and, 5) the program can be played back in the **SHUFFLE** mode, that is, all the sentences are randomly mixed and randomly played back.

Program Assignment. The voice memory of the ZL-10 system can be divided into a maximum of two parts, enabling the storing and distribution of two separate programs by one system. When divided into two programs, the programs can be randomly distributed to the student positions. The two programs share the total amount of storage time, i.e., about 32 minutes for the ZL-10C1 or about 15 minutes for the ZL-10C2.

Program Playback. During program playback, a digital counter indicates the location

of sentence playback in three different ways: in terms of time elapsed, in terms of sentence number, and in terms of percentage of memory in use. The teacher may select each indicator one at a time.

Specifications. Weighing approximately 7 lbs 4 ounces, the ZL-10TI teacher unit has the following dimensions: 15 x 2.8 x 11.4 inches. It consumes DC 12V, 1.4A of power which is supplied from the DC 12V supplied by the control unit. Input/Output connectors are as follows: Data transfer & power supply: 13-pin DIN connector x 1; Headset x 1: Mic. input -54dB 600 ohms ECM, output 8 ohms -20dB; Mic. input: Phone jack x 1 -60dB, 600 ohms dynamic mic.; Program input: Pin jack x 4: -5dB, 33K ohms; Recording output: Pin jack x 2; Monitor speaker (built-in): 8 ohms 75mW.

ALL METALS ARE GOLD, ALL FLOWERS ARE ROSES

So many good things have been said about the wizardry of digital, that if there were such a thing as a digital pedagogy, it would certainly rival that of Fénelon whose pedagogy can be described as all metals are gold, all flowers are roses. Unfortunately, the Sony ZL-10 is not the "perfect" language laboratory; it does not turn metal into gold, or flowers into roses. In short, it is innovative within limits. Before we discuss the limits of the ZL-10's innovativeness, however, let us briefly explode five myths that are currently circulating about this system.

Myth 1: The ZL-10 replaces Sony's top-of-the-line 5510 MKII Language Learning System.

No, the ZL-10 is not a replacement for the 5510 MKII or the Sony 4500 MKII for that matter. Sony officials see the ZL-10 as somewhere between audio active only and audio active comparison. However, when RAM becomes more competitively priced, it is not inconceivable that memory will cease to be a problem and storage capacity will be incredibly expanded. As a result, *all* language learning laboratory technology may be replaced by systems as of yet only in the imagination.

Myth 2: The ZL-10's digitized speech is artificial, without naturalness and human inflection.

Not true. The ZL-10 avoids the artificial sound of the Atlanta Airport's "the train is leaving the station; stand away from the doors" by utilizing Adaptive Delta Modulation rather than ordinary modulation. Voice reproduction by the system is remarkably "life-like" and clear.

Myth 3: The ZL-10 is operational at many institutions around the world.

No. The ZL-10 is a relatively "new" system. The system is in operation in Japan with 3 systems in operation at Kansai University, 6 systems in high schools, 14 systems in junior high schools, and 4 systems in use in museums. The first U.S. installation is in the Glasdonbury Public Schools in Connecticut.

Myth 4: The ZL-10 is *the* lab for all pedagogies.

No. There is of yet no technology that is suitable for *all* pedagogies. The creators of the ZL-10 did not come to your classroom or mine; they did not carefully study our pedagogies and the learning styles and objectives of our students and then develop the ZL-10 to meet the learning objectives of our students and the pedagogical objectives of our teaching. The quick random access capability which makes the ZL-10 truly unique in the world of language learning laboratories comes from the world of digital recording technology—long famous for its use in compact discs and pulse code modulation. The question remains: What pedagogical objectives are met by quick random access?

Myth 5: The ZL-10 is best-suited for use in high schools; it really has very limited applications anywhere else.

If you believe everything some of the vendors of this system say, you might be tempted to believe that this myth is true. To us, such a position seems rather short-sighted. It probably has not gone unnoticed by technology vendors that many states are mandating at least 2 years of foreign language in high schools. If every high school purchased a language lab because of this mandate, language laboratory stock should be in all of our portfolios. Undoubtedly, Sony would be very pleased if most of the high schools purchased ZL-10 systems. It seems reasonable to assume that if the ZL-10 can help students learn languages and teachers teach

them, then it should be considered at all levels of education where languages are taught.

Although the myths currently circulating about the ZL-10 are not true, the fact that its innovativeness has limitations is true.

Digital Voice Memory Blues

More Is Less. Given the cost of RAM, the storage capacity of the ZL-10—configured with a maximum of 64 student positions—is **more capable** in terms of quick random access than conventional tape-based systems but there is **so little of it**. With only 23 minutes and 44 seconds of program storage time for the system configured with the maximum student positions, we as pedagogues may rightfully ask “What aspects or concepts of our foreign language pedagogy demand so little program storage time?” Could it be that this “new” technology almost inevitably necessitates a new corresponding pedagogy?

He Who Hesitates Is Cut. If we asked our foreign and second language students whether this system demanded a new pedagogy, most would probably say “Yes.” Ironically, such an answer is not necessarily based on their understanding of pedagogy or technology, but rather on what they like and don’t like.

In researching the ZL-10, we enlisted the aid of students—bright, articulate, motivated foreign language students—who shared with us their reactions to the system. They were the first to sing the digital memory storage blues. Although our sample was small, without exception, every student in it lamented that **8 seconds of total response time is not enough**. Using a master target language tape program (in languages with which the subjects were unfamiliar) currently in use in the language laboratory, we loaded it into the ZL-10, and allowed students to listen to it all the way through, as it was being stored. Such listening-while-storing is a feature of this system. When we released students to actively work with the exercises on the tape program, either the exercise demanded answers or repetitions of longer than the 8 second drill-record time, or by the time students figured out what was to be said and hesitantly started speaking, the 8 seconds were up and their responses were cut. Not only did this cutting off annoy and frustrate students, it also prompted them to suggest that we either

come up with better tape programs or stick with the tape-based systems.

When we asked the students in our sample if they would prefer using the ZL-10 to other language laboratory systems they had used (some were transfer students from schools using the Tandberg IS-10 language laboratory; others, were from schools using the Sony 5510; still others had used the old 3-M Wollensak systems), all of them, without exception, said “No.” When we asked them why not, they all agreed that it really didn’t matter which language laboratory technology was in the student carrel; as long as the tape programs were endless repetitions of classroom exercises and there was no teacher at the console to monitor their progress and help them, it really made no difference what lab was in use. Going to lab was boring and not very helpful, especially at those schools where all that mattered was how many minutes they were in lab, not what—if anything—they did while they were there. Thirty percent in our sample admitted they often slept during their 60-minute, weekly “required” time in lab. When we asked the students in our sample what they did while in lab, 50% said, “Sixty Minutes.”

Even with such a small sample, we wondered what students would do differently if they ruled the foreign language curriculum. Half expecting them to say “Eliminate the foreign language requirement,” we were pleasantly surprised to hear no one in our sample suggesting that foreign languages or lab requirements be abolished. On the contrary, all of them were for the requirements (somewhat surprising to hear even from highly motivated students who excel in foreign languages).

When we asked them how they would change what went on in the foreign language classroom and the language laboratory in terms of learning a foreign language, their suggestions were remarkable and to some extent, reflected their concerns about what they felt technology should help them do for themselves and what technology should help teachers do for students—concepts at least as old as the educational philosophy of Herbert Spencer.

Herbert Spencer, whose pedagogy could be described as one promoting the concept of **nature the nearest is nearest the best**, was fond of

saying that "education is all that we do for ourselves, and all that others do for us, for the purpose of bringing us nearer the perfection of our nature...The ideal of education would be...a complete preparation for life as a whole." Although Spencer has often been criticized in that his ideal education is only for the privileged elite and not applicable to the human conditions and social realities of popular education, there are those today who would have us believe that the one thing that can rescue Spencer's nature-the-nearest-is-nearest-the best education from the private preserves of the privileged few is massive infusion of technology into the teaching and learning processes at all levels of education.

Unfortunately (or fortunately) for Spencer, he did not live in the Age of Information. Be that as it may, let us use his definition as we consider the Sony ZL-10 digital voice memory language learning laboratory system and see what it allows 1) students to do for themselves in mastering a foreign or second language; 2) teachers to do for students in order to help them perfect their communicative competence in target language fluency; and 3) how technology may or may not bring both teachers and students nearer to perfecting their interaction.

THE STUDENT, THE ZL-10, AND LEARNING OBJECTIVES

Quite often, if not always, technologies get invented because it can be done, get selected and used because they are available, and in the process, get to become something they should never be, namely ends in themselves. The creation, selection, and use of a particular technology in education must always be as means towards a specific end.

In foreign and second language education, our students have specific learning objectives that concern them; they hope that teachers and courses will help them reach those objectives so that in the end they will achieve communicative competence in the target language of their choice. If, as Wilga Rivers maintains, our students' concerns must be our concerns, then for the purposes of this feature, let us examine how students view the ZL-10 as a means toward reaching their target language objectives and, thereby, their goal of achieving communicative competence.

Target Language Learning Objective 1: Instantly finding the part you want to hear. The random access capabilities of the ZL-10 get very high marks from every student in our sample for allowing the user to jump—almost instantly—to any part of the program he or she wanted to hear. The ability to jump within a second to the beginning or end of a particular lesson or exercise appealed to our time-conscious students who indicated that saving time was important to them.

Target Language Learning Objective 2: Having control over what the technology does and how it performs. Perhaps because as children they exercised so much control over the dominant technology in their lives, namely television, all of the students in our sample wanted complete control over the functions of the ZL-10. Students in our sample felt that there was a great deal they could do for themselves when it came to achieving target language learning objectives. Although the ZL-10 permits playback in five different ways—play as is, play with pauses after each sentence, play with 1 second pauses between sentences, play every other sentence, and play sentences randomly mixed—it is the teacher who determines how the lesson will be played back and not the student. Although students accept that various playback modes at certain times may help achieve pedagogical objectives, at other times, why could they not select from the student unit the playback mode they wanted?

Target Language Learning Objective 3: Learning by speaking and imitating the speech of native speakers of the target language. Nobody learns to speak a target language by listening only; everyone has to open his or her mouth and speak it. All of the students in our sample found the 8 second response time allotted to them by the ZL-10 too short, frustrating, and inadequate for imitating the speech of native speakers. They found the button pressing procedure of first play, then drill-record, then repeat, then play again on the student unit in order to hear the native speaker, followed by their maximum 8 second response, and then finally pressing play to continue the lesson tedious, unnecessarily cumbersome, and awkward.

Target Language Learning Objective 4: Speaking and pronouncing the sounds, phrases, and idiomatic expressions of the

target language should be something students do on their own with technology in the language lab; grammatical explanations about structure and syntax should be left to the teacher in the classroom. It was somewhat surprising to have students say that they preferred to have target language grammar in the classroom from their teachers and practice in pronunciation, target language idiomatic expressions, and phrases in the laboratory. The majority of students in our sample decried the fact that their foreign language courses overdid the grammar by having students do the same grammatical exercises in class that they had to do again in the laboratory. All the students in our sample were extremely critical of current publisher tape programs which amounted to nothing more than the exercises in the textbook on tape. Since we were using current publisher tape programs with the ZL-10, some students went so far as to suggest that if we completely changed the audio tape programs in the lab and had them concentrate on pronunciation exercises, short phrases and idiomatic expression practice exercises, then the short response time of the ZL-10 would be much less of a problem, since the responses would be shorter than those demanded by current audio tape programs.

When we asked the students in our sample why they preferred to have grammar drill-and-practice with the teacher in the classroom rather than in the lab with technology, they indicated that no matter how sophisticated the technology in the language lab, it could not respond to them as a human teacher could. Technology treats "everyone the same." No matter how many different examples and explanations, "they are always the same for all students." "If I don't understand an example or an explanation," said one of the students in our sample, "my teacher can find a way to explain it so that it makes sense to me by associating it with what she knows I already know. Even the sophisticated computers at M.I.T. don't know how to do that." Said another student, "My teacher is an example of how I want to speak French, how I want to act and sound when I go to France. There isn't a technology on the face of the earth that I want to be like."

Clearly, the students in our small sample had no great difficulty manipulating the ZL-10 nor

were they overly impressed with its superior random access capabilities. What about teachers? How do teachers react to the ZL-10 as a means to helping improve their foreign and second language pedagogy so that as teachers, they are better able to help their students achieve communicative competence?

TEACHERS, THE ZL-10, AND LANGUAGE PEDAGOGY

Our sample of teachers who used the ZL-10 for the purposes of this feature was also admittedly small. Be that as it may, however, everyone in our teacher sample has been in the classroom for over 10 years, has used technology in pedagogy, and has influenced curriculum policy at the institutions where he or she has taught.

Any critical reader will note at once that both of our samples—student and teacher—are biased in favor of foreign languages and toward technology. True enough. However, students who take foreign languages only because they are required and teachers who do not think technology can improve pedagogy do not use technology. They are the students who come to the language lab and sleep or read comic books; they are the teachers who say "Prove to me that using technology makes a difference, and I'll send my students to the lab." Of course, there is no definitive, conclusive, dramatically vivid proof that students learn anything better with technology than without it.

Teachers in our sample represented various pedagogies and approaches to language teaching. They responded to the various features and functions of the ZL-10 in the contexts of those pedagogies and approaches.

ZL-10 Feature: *Instant access to any part of the lesson.* Without exception, teachers, too, find the random access capabilities of the ZL-10 very nice. When we asked teachers how instant access to any part of a lesson fit in with meeting pedagogical or learning objectives, they all seemed to think that as such, instant access met no objectives; it simply saved time in order to pursue those objectives.

ZL-10 Feature: *Playback of lesson in five different ways.* All teachers in our sample objected to the **PERSON CUT** label of one of the five playback modes. "Why not call it

SENTENCE CUT, for heaven's sake!" said one of them. "After all, that is what is actually happening—every other sentence is not heard. We are not in the business of cutting persons, are we?" When we asked our sample of teachers why they thought these five ways of lesson playback were available, 75% thought that these modes existed as the result of what the technology could do and not what teachers—or students, for that matter—needed in order to help students achieve communicative competence in the target language. When we asked them how they felt about the scope of this technology being largely determined by its memory capacity and digital capabilities rather than by the subject content and their pedagogy, all of them did not like technology dictating their pedagogy.

Seventy-five per cent of the teachers in our sample felt that the current audio tape programs would have to be drastically changed in order for them to work well with this system. For example, in the **PERSON CUT** mode—which everyone in our sample thought would be very useful for role play and dialogues—every other sentence is played. However, that works only if sentences are defined as the ZL-10 defines them: If followed by a pause of more than 1 second, the ZL-10 recognizes such a string as a sentence. If a phrase or sentence ends with a pause of shorter than 1 second, the voice memory does not record it. Many current audio tape programs provided with textbooks currently in use, when used on the ZL-10 in the **PERSON CUT** mode, present dialogues at native speed that have numerous sentences that are *not* followed by 1 second or more of pause. These sentences are simply not recorded by the voice memory of the ZL-10. For this feature to work properly, it is first necessary to edit the program so that it conforms to the 1 second sentence separation mode.

The ZL-10 playback mode found most useful by all the teachers in our sample was the **SHUFFLE** mode. When we asked the teachers why they liked the **SHUFFLE** playback variation, they felt it was ideal for dictation, since in this mode 100 phrases from the memory can be played back in random order. Given today's technology, some wondered why *only* 100? The **SHUFFLE** mode also requires that the loaded program be edited to conform to the ZL-10's system protocols.

All teachers in our sample questioned the length of pauses that the ZL-10 inserts between sentences in the **INSERT PAUSE** mode. Pauses inserted during this mode are determined by the preceding sentence or phrase; every pause inserted by the ZL-10 is exactly **1.2 times the length of the previous sentence or phrase**. All the teachers in our sample felt that the length of a pause depends not only on what the student is asked to do in the pause but how difficult it probably will be for him or her to do it. To pre-determine that a phrase or sentence prior to the pause dictates the actual length of the pause brought visions of Skinnerian operant conditioning to the minds of some of the teachers in our samples. "We're not dealing with rats, here," said one. "We're dealing with people."

ZL-10 Feature: *Editing a lesson prior to playback.* Although the ZL-10 can combine a sentence with the next one or divide a sentence into two separate sentences, the way in which most of the teachers in our sample thought this would be useful to them in helping their students learn was that they could break up long sentences into segments for practice and then put them back together again. The procedure for accomplishing this, however, was somewhat complicated for 75% of the teachers in our sample when we asked them to do it just by reading the ZL-10 Operation Manual. Once we demonstrated how to do it on the ZL-10 Teacher Unit, teachers in our sample found it relatively easy to do.

ZL-10 Function: *Model voice capabilities of the system.* The foreign language teachers in our sample indicated that in their pedagogy, using students as model voices for the rest of the class was something they rarely if ever did. English as a Second Language (ESL) teachers in our sample (some of whom are currently using this capability with other laboratory systems), however, were enthusiastic about this feature of the ZL-10. Although very enthusiastic about this feature, ESL teachers in our sample found the ZL-10 restrictive in this regard simply because the technology prohibits model voice practice in both groups simultaneously if the class has been divided into two groups. "I have students at various levels of ability in my classes," said one ESL teacher. "What I want to be able to do is divide my class into two separate groups, select a model voice for each group, and have them

practice at the same time on different aspects of communication. Why can't this system do that?"

ZL-10 Function: *Pair practice.* Not one foreign language teacher in our sample ever asked students to practice in pairs. ESL teachers, on the other hand, often use this feature. Although delighted with the fact that the class could be divided into two groups, with adjacent or random pairing in each group, ESL teachers were not pleased with the fact that if they pressed ALL CALL to speak to the groups, the ZL-10 cleared all the pairing parameters. "I use pair practice to evaluate my students," said one ESL teacher, "and I want to be able to make comments to the students." When we indicated that this could be overcome by activating a Room Speaker, the ESL teacher said, "I prefer to use ALL CALL. Who's the teacher? I or the ZL-10?"

ZL-10 Function: *Monitor and Intercom.* Since all of the teachers in our sample were familiar with these functions from their previous experience with other language learning laboratory systems, they expected these functions to perform as they do on other systems; none of the teachers in our sample had any problems with these functions, nor did they make any comments about them.

ZL-10 Function: *Teacher control of student's lesson.* "Sony must not want teachers to control students' practice with the lessons," said one of the teachers in our sample. We thought that was a curious observation, since on the Teacher Unit there is a control section with buttons to do exactly that: control what students do with the program. When we asked the teacher to explain what she meant, she offered the following explanation: "First of all, there is no clearly defined section in the ZL-10 Operations Manual devoted specifically to this function. Instead, there's a little bit about it on page 46; a little bit about it on page 33. All the other functions are explained in their own little sections, complete with large-print, color, and graphics. What is most annoying, however, is that the teacher can only control student work with the program when the student is in free practice. I work actively with my students; they are rarely in "free practice." I want to be able to control their program in any mode, not just in free practice or library."

ZL-10 Function: *Teaching two lessons in tandem.* All the teachers in our sample indicated that ability levels in their classes were always diverse, so that the ZL-10's ability to run two programs in parallel was the absolute minimum number of programs they could accept from today's high-tech language laboratory systems. "We could use more than two lessons," all of them said. "With 30 people in my classes, I have more than just two levels of ability," said one teacher. "Even a system that allows me to play four different programs sometimes does not allow me to take all the ability levels into consideration."

IMBEDDING TECHNOLOGY IN THE STUDENT-TEACHER INTERACTION

It has been estimated by the Department of Education that 98% of our students come into our classrooms addicted to electronic learning, that is, conditioned and pre-disposed to technology as the result of growing up with television. Electronic addiction might help to explain a statement by Albert Shanker who recently stated that approximately 80% of our students are not reached by nor do they respond to our "traditional" methods of learning and teaching.

All the students in our admittedly small sample who used the ZL-10 for the purposes of this feature are children of the Information Age, having grown up in this age of electronic glitz and glitter. All the teachers in our admittedly small sample who used the ZL-10 for purposes of this feature are part of the Information Age with intimations of life prior to the time when technology was everywhere imbedded.

Today, it is not uncommon to hear much discussion and debate about the "quality of life." In concluding our discussions with the students and teachers who worked with us and the ZL-10 for the purposes of this feature, we raised the issue in the context of the student-teacher interaction and asked both students and teachers for their observations on how this interaction had been affected by imbedding technology in it. The following summary of their comments, both in terms of candor and emotion, is revealing.

Students readily admit that they can perfect their foreign and second language fluency using

technology; what they desperately want is not to please the technology but to please their teachers and themselves. They look for meaning not in the technology but in the teachers whom they admire. They reflect their teachers and want to be like the teachers they admire. Contrary to what is often thought, students prefer using technology with the help of their teachers, not on their own without guidance. If their teachers don't care how they use the technology or what they do with it, students don't care either. Teachers teach themselves first and no technology comes between a student and what the teacher teaches of himself.

Teachers, for the most part, are skeptical and leery of technology. They fear being "shown up" by it in front of their students. As one teacher remarked, "I overheard one of my students say to another, 'My teacher's French pronunciation isn't too hot; I've been working with the Pleasants' program in the lab and that's helped me a lot to improve my pronunciation, but I let her think she taught me.'" Furthermore, teachers see the use of technology as requiring more work not less on their part, and with all the things they have to do, for most of them, technology means more work not less.

Over 50% of our sample indicated that they loved teaching and would like to devote all of their

time to teaching, but unfortunately, at their institutions, improving pedagogy was not rewarded; published research in their literary specialties preferably in prestigious journals was what counted in the tenure/salary/promotion process.

In concluding our feature on the Sony ZL-10, we would like to thank both the students and teachers who shared their comments about the systems with us and our readers. We would also like to thank the people at Sony for their helpful assistance in allowing us the freedom to work with the ZL-10 at our leisure. We recommend to all our readers: If you are interested in language learning systems, determine your pedagogical and learning objectives and then contact *all* the manufacturers of the systems currently available, have them come to your institution or location with the system (they all have portable versions), contact current installations with the systems and make arrangements for a visit, and get as much "hands on" with the system as you can. We, at *J.E.T.T.*, have featured the major systems on the market (Volume 20 and 21, with updates on various systems as they occur) and we recommend you get copies of those issues to help you decide which system will best meet your objectives.