Everybody is excited about the use of interactive videodisc for language instruction. There is good reason to be optimistic because this medium offers much of what we have been waiting for since the benefits of using audio-visual materials in teaching languages were first recognized.

Of most interest to language teachers is the random accessibility of hundreds of segments of instruction, full-color motion and still images, dual audio tracks and the computer interface which allows intelligence.

But there are also some negative aspects. The interactive videodisc is audio-poor since an interactive one-sided disc allows a maximum of 30 minutes of audio. Likewise, the videodisc is limited in its motion video capability. While this constraint hampers designers of interactive language materials, it does not cripple them; creative use of very short motion and audio segments, computer text, and still frames has done much to stretch that limited capacity and use it effectively.

A more serious, and potentially debilitating factor is the cost of designing and developing interactive language materials. A budget which would be sufficient to cover the costs of designing programs, filming all necessary language materials and pressing lesson on disc for a year's study of a foreign language would be truly staggering.

Despite the best efforts of people like Larrie Gale of Brigham Young University and this author, who are exploring more economical ways to program interactive video instruction expenses may outstrip resources to pay for this innovative new instruction. Larrie Gale is researching the use of templates as a tool for programming low cost interactive videodisc materials from existing video sources. Gale uses the same computer template for programming a number of annotated videodiscs from existing video sources. He and his team are also looking into the development of an authoring language to be used to produce lower cost instructional materials. This author has programmed one disc, \textit{Klavier Im Huas}, and is currently working on others which use existing video footage. It is part of an ongoing effort to uncover certain heuristics or rules of thumb which are useful in developing low-cost training materials.

One approach to holding down costs and still benefiting from the random accessibility and dense storage capacity of the interactive disc uses still-frame language programs. Major Allen Rowe, of the Defense Language Institute, piloted this approach with an experimental disc which uses single-frame, comic-book-type drawings of language situations. Although the disc was a bit primitive, and roughly linear like the video tape from which it was taken, it suggests a possibility that perhaps at this stage of development, language instructors might consider thinking of an interactive videodisc as a very dense from of data storage, indexing thousands of still images or short-motion sequences which could be paired with computer text and accessed upon demand.

However, regardless of the specific application of interactive videodisc and computer system one chooses to adopt, one thing seems quite clear: cost must be reduced if the technology is to have significant impact in the language instruction area. We must discover ways to reduce the cost of obtaining the original footage of visual materials, we must reduce the cost of designing the
branching programming, we must lower cost of transferring images to mater tape and, as the volume of interactive
videodisc instructional materials picks up, then we might anticipate lower costs for pressing and duplicating discs.

Transferring Still Frames
This author has been researching ways to lower the cost of transferring still frames to mater videotape. After
looking at the main reasons that costs for this transfer were so high (The expense of handling of thousands of slides, and
labor for intensive edition in a studio environment), he recognized the need for finding a process which allowed for the
automated transfer of thousand of still images to videotape of film without the loss of image quality normally sacrificed
during image duplication. Mr. Tom Ramsey of Slides in Motion originally tackled this problem, and developed optical and
color correction equipment which produced high quality single-image transfer capability. This equipment was recently
purchased by Interactive Video Associates (IVA), of Logan, Utah.

IVA has added automation to the system, thus substantially overcoming the problems of premastering slides to
single frames of video tape with quality, economy and speed. IVA uses a process VIDEODISC NEWS describes as
follows:

"The conversion system is an automated computer-controlled process that gives optimum control
on each slide, including contrast (which has been the biggest problem in obtaining quality in conversion).
The...conversion process produces sharp focusing from edge to edge without light loss and
without producing the grainy effect achieved by less sophisticated conversion systems."

The current system is capable of:
• A rate of over 5,500 slides per day.
• Contrast adjustment while copying
• Retention of color balance.
• Full enlargement of as little as 1/25th of a scale
• Automatic adjustments for horizontal and vertical format slides.
• Motion sequences utilizing zooms, pans and tilts on a slide.
• Ability to premaster multi-projector slide tape shows.

With these developments, large volume still-image access is no longer a prohibitively expensive technological
pipe-dream; it has made possible a cost effective high-density storage medium.

Teachers of foreign languages who have access to authentic slides of people, places and events in their
language geography might see these used for low-cost interactive videodisc instructional programs.

Enhancements of Still Frames
Regardless of the source of the image, the best quality original always insures the best quality image on the disc.
The process already described does, however, have the ability to enhance slides during premastering. Its variable
contrast capability allows for the reduction of contrast that is appropriate for originals, duplicates and slides with scenes
containing great brightness range. In some cases the disc images are more uniform and match better then the master
slides. The system is also capable of altering the density of over- and under-exposed slides as long as there is detail in
the image. color shifts form one type of film to the next it also eliminated by a color correction module.

Vertical formats may be changed to horizontal images, although about 5% on each side of the center of the slide
is lost during this operation. However, the entire slide may be copied if a small amount of black can be tolerated above
and below the image on the television screen. The entire slide can be copied within the television frame or portions of the
slide can be magnified to fill the entire frame. The optics permit as little as a 1/25th of a sharply focused 33mm slide to be
enlarged to full-frame video. At this magnification, the image will still appear to be copied from a full-frame original slide.
Motion sequences may be created from single slides, for example, a pan from left to right across a slide produces on the
master tape the illusion of motion moving from one side to the other, as would a zoom in or out on a still frame. With this
new system, costs have been reduced in most cases 50 to 70%. A slide may cost less the $1.00 to be premastered
including all materials. Their price is affected by the quantity of slides needed and additional services requested.

Increasing Audio
It is also now possible to put sound with single-frame still images on the videodisc. Sony, using their knowledge
of DMC digital audio and single-frame recording has created a still-frame audio adapter which enables a videodisc to
contain up to 15 hours of real time audio-playback on a single disc side (this would reduce the available video frames from
54,000 to 1,400). Although critics of the system would be discouraging about this loss of video, the remaining 1,400
images attached to 15 hours of audio, all randomly accessible, offer language instructors a marvelous opportunity.

Using the Sony still-frame audio adapter, a language videodisc could be capable of giving the student up to 40
seconds of audio with every sinje frame of video. These 40-second bursts of audio-on-still could be mixed with music,
motion and sound, and computer text. Perhaps the optimal design of these single-frame sides would include enough
motion and audio segments to create interest and show action whenever necessary, but to reserve the bulk of the data
base for single frames of visual information to create lessons which are densely packe3d onto the disc. The opportunity for creating foreign language simulations is remarkable. Under these conditions one can perceive of language discs capable of providing a year's study that are not prohibitively expensive. Videodiscs of this type could be developed to deal with basic functional notional language topics and distribution of learning material will allow development costs to be amortized across broader user population.

Conclusion

Single-frame video for language instruction? The pieces are beginning to fall into place; low-cost transfer of slides onto video disc and digital-compressed audio, available over single frames. All that is really lacking now are the modest resources necessary to fund development, language teachers prepared to use the medium for instruction, and quality software developed by creative and enterprising teachers-of-language specialists and instructional designers.