

AUDIO IN LANGUAGE TEACHING

Although the use of video in language teaching has received a great deal of attention, the audio medium should not be neglected or considered to be "old hat." This medium is spontaneous and uniquely personal and can often produce better results than printed texts. When audio is combined with visuals and worksheets, learning is improved because more senses are being used to assimilate the information. The Cone of Experiences (devised by Edgar Dale to classify types of learning) shows the broader appeal of learning where experience and usage are on several levels. The multi-sensory approach results in better attention, retention, and recall. Only the skill of the producers of the audio program, whether commercial interests or teachers, limits the ability of audio to stimulate the visual imagination. The improvement of these skills requires that the producer/teacher develop good audio editing techniques. In order to make audio programs more interesting some of these ideas from an Indiana University Handout of recording techniques should be followed:

1. Use relevant music breaks not only to begin and end the tape, but also to separate exercises.
2. Use a narrator to handle topic transitions and to reinforce key points of content.
3. Use a variety of voices and accents.
4. Use simulations, sound effects, and editing to suggest different localities and incidents; this will make the presentation more exciting.

Guidelines for Selecting Commercially Prepared Tapes

1. Do the tapes provide for the type of learning you want the students to achieve in the lab? Do they contain listening comprehension exercises, grammar exercises phonetic drills?
2. Are the tapes coordinated with the text or a lab manual.
3. Do the segments reflect pages, chapters, selections of readings? Are the directions clear and will the students know how to use the materials?
4. How will the tapes be segmented for lab use? Chapters? Pages?
5. Is the speaker's voice pleasant? Clear? Is their a dialect?
6. Is speech at the correct pace for the type of exercise and the level for which it is to be used?
7. Are the instructions in English or in the target language? Are they clear and precise?
8. Are pauses long enough to provide for student comprehension and repetition?
9. Are there musical or conversational filler of interest?
10. Are the correct answers given after the pause for student repetition?
11. Are there any grammar or pronunciation errors?

Guidelines for Recording Tapes

1. Check the equipment and the tape to make sure that they're in good working order.
2. Avoid all extraneous noises; if done at home, for example, the refrigerator or the phone can be a problem.
3. Use the pause control of your tape recorder. Constant stopping and starting creates clicks that can be annoying to the listener.
4. The recording should be made by someone who has a clear and a pleasant voice.
5. Allow for sufficient time for the leader tape at the beginning of your recording.
6. Watch the VU meter for the proper recording level. Run a voice check before beginning the recording.
7. Provide clear instructions and good model sentences.
8. Each tape should begin with its title--e.g. French 102, tape 13b.
9. Provide sufficient pause time, then give the correct response, then pause again for student repetition if desired.
10. The maximum length of a tape is 20 to 30 minutes and it should be recorded on a C-60 if it is intended for use in the language laboratory. The tape should end in a logical spot--at the end of an exercise or of a page.

Technical Quality Relationships

1. Is the taped material technically good?
2. Is the physical size and format useable?
3. Will the tape last long enough making it a cost-effective purchase?
4. Is the content free of conflicts and distractions or are these conflicts presented in an unbiased manner to fully inform students of the issue?
5. Did the producer use experts in preparing the materials?
6. Can you make a back-up copy for safety reasons or change the format to make using the material simpler?

An experienced teacher/lab director learns how to evaluate audio visual material quickly. Materials must be evaluated before being used in the classrooms to prevent surprises and to insure relevance. The Association of Educational Communications and Technology (AECT) has several excellent books and filmstrips on evaluation techniques to help new teachers.

(A) RECORDING SUGGESTIONS

Recording level: setting a recording level is usually a compromise between a setting high enough to record faint sounds and a setting low enough to record low passages without distortion. Too low a level will require turning up the volume on playback with resulting increases in machine and room noise. Too high a level will cause distortion of the loud passages. Optimum recording is usually reached when the loudest steady

sounds read 0 db on the v.u. meter. Occasional loud sounds of short duration can peak into the red indicator on your volume meter.

Reduce Noise: avoid extra noise and where possible record in a quiet room with electrical equipment turned off. Keep the microphone reasonably close to the source of the sound. Use the volume control and not the voice to control the recording level.

AGC: unless you are trying to record the entire room, turn off the automatic gain control on the tape recorder and use the recording level manually. The AGC raises or lowers the volume according to what it hears; if dead space is needed, as in pauses, the volume will be turned up by the AGC as if searching for sound, thus increasing the room and tape noise.

Delivery skills: make it interesting for your listeners, animate your delivery. But watch the distance from the Mic when recording so that the voice range is constant. Step back for a voice fade, add some simple sound effects.

Test runs: always run a trial to check on room noise, recording level, mic and equipment operations before beginning the program. Practice with the machine. Set the digital counter on 000, press record and play, allow the movement past the leader and into the tape, check the VU meter as a passage is read. Rewind, play back and evaluate.

Microphones: avoid built-in microphones for a better recording; use external microphones as much as possible. Two hints for better recording; put the microphone on a different surface from the machine to separate from motor noise, and stand the mic up when recording. Instead of laying the mic on a hard surface when a stand is not available, build a stack of books up and top with a pillow or soft foam, then place the mic towards the speaker. A brief breakdown of microphones will follow.

Impedance: low impedance...is relatively immune to both electrostatic (fluorescent lamps) and electromagnetic interference. Lo-Z mics have low signal losses and can be used with long mic extension cords. High impedance mics work properly only with relatively short cables otherwise the recording loses certain frequencies.

(B) Microphones

Audio is often the most important element and the most often overlooked element in instructional materials. Video without good sound is generally not useable. A poor video tape with good sound value can frequently be of value as an audio cassette.

Whether recording the spoken language, music or sound effects, a good microphone is essential.

A microphone has one purpose--to convert air wave energy to electrical energy signals. How a tape program is to be made and how it will be used governs the choice of microphones. There are fewer differences in mics today than there were even five years ago. The deciding issue is personal

preference. If you hear a difference, pick the mic that best meets the overall need. Once the decision was about ribbons, condensers, dynamics, and carbons. Today, a good condenser mic for music, a dynamic for voice recordings, and one of the flat condenser units for lecturns solves most problems until production work begins. For productions, find a good recording engineer and/or read up on microphones. A generalized description of microphone terms follows.

Two basic components:

diaphragm.....the membrane that vibrates in accordance with the pressure variation of sound.

generating element.....the element that converts the diaphragm vibrations into electrical voltage

Three pickup patterns:

Uni-directional.....picks up sound from one direction and little from the sides or back of the microphone, designed for use by one person

bi-directional.....equally responsive from the front or back and relatively little from the side, good to use in interviews.

omni-directional.....responses equally to sound coming from all directions, good for small group sessions

Varieties of pickup elements:

Carbon.....metal diaphragm with carbon granules, good for mobile and portable work, telephone uses carbon

dynamic....less expensive (diaphragm with moveable coil) can be high or low impedance, widest frequency range, least susceptible to damage from shock and temperature

condenser.....highly sensitive, battery operated (diaphragm)

ribbon.....delicate, not recommended for rough or outdoor use, good for studio use (foil ribbon vibrates)

Three basic groupings based on design:

handheld or used in a mic stand.....can be directional to reduce stray noise if using uni-directional mic (the speaker must stay close to the mic, no wandering) or it can be used with a bi- or omni-directional mic for interviews and small groups

lavalier.....worn by the speaker, permits more freedom of movement, has low bass response, omni-directional because the speaker may be using the blackboard or doing demonstrations which require movement away from the podium.

shotgun.....long range mics or parabolic reflectors are highly directional with barrel extension for picking up sound over a great distance and in favor of the sounds they are pointed towards (the ultra directional shotgun can be seen in field video recordings).

Selection by purpose:

directional-sound pickup from one major direction-the front, other sides/directions are "blocked". For example, a shotgun (which must be pointed at the speaker) is useful in areas when only one persons response is wanted.

cardiod - sound pick-up is heart shaped, discriminates against room noise and reverbation, but speakers must stay on-axis, no wandering away from the podium, good for two speakers placed close together, good for auditoriums and areas with loud equipment noise exists and only the speakers are to be recorded.

omni-directional - picks up sound vibrations from all directions, produces a lower bass sensitivity, good for small group recordings.

A new aspect is the wireless microphone--another instance of technological miniaturization and improvement in circuitry. Good systems are still expensive and repair work at this times requires a specialist. Basically, the wireless operates with an RF frequency (UHF or VHF) and an antenna system plus the battery operated units; primary problems are dropout and interference from other signals. If you have the money and doing production work, be sure to check out the new wireless systems. There are inexpensive systems on the market, use them with great care.

Readings:

George Peterson, "Wireless Microphones," MIX, vol. 10. no. 4, April 1986.

David G. Meyer, "Better Audio," EITV, February 1985.

Craig Anderton, "understanding Mixers," AV Video, July 1984.

Richard Chinn, "Testing 1-2-3-4...Where Mics Stand Today," AV Video, January 1985.

Jim McCandliss, SOUND SYSTEM HANDBOOD, VOL. 1, Mix Bookshelf, 2608 Ninth Street, Berkeley, Ca. 94710.

Alex Nisbett, THE USE OF MICROPHONES, Mix Bookshelf, 1983.

(C) AUDIO CASSETTES

Which cassette is the best to buy? There is no way one can answer; some tapes work well in some machines under certain conditions, some do not. The best answer is its predicted use. In determining the use, the following factors should be considered.

Manufacturing requirements for all compact cassettes were specified by a 1965 agreement with Morelco Phillips and the International Electrotechnical Commission. But these are purely dimensional characteristics of the cassette and its mechanical components--in no way do these relate to the quality of the cassette.

The seven components inside the cassette can effect the reliability of a master recording. These component differences between expensive and cheap cassettes will affect duplication. Cassettes are commonly sold as C-15, 30, 45, 60, 90 and 120 minutes. Those playing longer than 60 minutes should be considered special purpose tools, due to the very thin nature of the tape used. Cassettes of this length are good for documentary type recordings but require special care in their operation. Machines of marginal quality may not have sufficient power to take up that much tape for proper recording and playback. As far as dimensions, tape width for cassettes is standardized at 3.81 milliment, while its thickness will vary: thicker for shorter tape--18 microns (60 minutes or less), and thinner for longer ones--12 microns (90 minutes) and 9 microns (120 minutes) depending on the manufacturer.

In timing thirty brands of c-60 cassettes, actual playing time for one side was from 27 to 33 minutes. Some of the better cassettes frequently have second marks indicated on the leader tape which runs for five seconds. The leader tape is on both ends to ensure properbonding and holding strength within the hub. When recording, it is important to remember to go past the leader tape before starting the program and to stop before the tape ends; leader tape is at beginning and end of each side of the cassette.

To help decide on a cassette brand, buy several brands of differing price ranges. Open each one, look at the parts that move; there are 3 to 5 moving parts in a cassette--with more movement, comes a little better quality. Check the internal components against the other brands; copy the same program on several different brands and compare the results in your own machines. Preform your own listening test. Decide before any bulk purchase, what you will do with the cassette. If its purpose is a one time play or give away tape, an inexpensive tape might do. If it is to be used as a master, the best tape you can afford will be needed. If it will be used by students for a semester, try some of the duplicator tapes that can stand up to repeated high speed duplication.

Listeners are very sensitive to the relative quality of audio tape recordings. Though they may tolerate a lot of static and noise to listen to an original recording (1940) of Winston Churchill, few will listen to language lessons under those same noisy conditions. The cassette chosen for classroom work is important.

Tips

- a. Keep your cassette clean
- b. To prevent snarling or jamming of the cassette, take care to wind the tape with a pencil to take up the slack of the tape.
- c. Take proper care when loading the cassette into the deck. If the tape is not inserted properly, damage may be caused to the tape and the machine.

- d. Make sure that your fingers avoid contact with the tape surface. Body oils, grease, food or drink can cause a film on either the tape or the heads and thus causing drop-out and unwanted noise.
- e. Upon completing a recording, the tape should be wound to the end of either A or B side with the leader facing outward.
- f. When you've made an important recording, which you wish to keep, remove the small lugs on the end of the cassette. This will prevent accidental re-recording.
- g. Always store the tape in its plastic case or other designed storage unit.
- h. Avoid extremes in temperature and humidity, and keep out of direct sunlight. High temperatures or direct sunlight will warp the cassette shell, high humidity (over 80%) will cause tape transport problems. Be especially careful to avoid getting the cassette wet.
- i. Keep away from dust and dirt--they cause unwanted noise and drop-out.
- j. Keep your cassettes away from magnetic fields, such as t.v.'s, radios, speakers, etc., which may sometimes erase your recording or create unwanted noise.
- k. Keep your cassette away from chemicals such as alcohol and Benzene.
- l. Remember cassettes are not permanent, treat them as expendable supplies.
- m. If you have problems with a cassette, discard it immediately, do not continue to record valuable information on the damaged cassette. Please do not try to use a damaged cassette in a duplicator.

CASSETTE COMPONENTS

SHELLS: are composed of good plastic to give the best service at room temperature. Sometimes the statement on the cover sheet indicates "tested up to 150 degrees F"--avoid proving this issue. Look for warpage or other deficiencies in the shell itself, cracks, chipped corners, aligned edges?

SHIM OR LUBRICATED SHEET: is there to protect the tape pack from the plastic shell. The shim should be able to withstand friction and should be slippery. This shim is supposed to be somewhat bent--some have raised surfaces; it is to serve as a cushion, somewhat like a shock absorber. The tape should move up and down a bit and slide from side to side. The shim eases the tape's progress at rapid speed. In cheaper cassettes the shim is composed of cellophane with a small amount of graphite. In more expensive cassettes the shim is composed of teflon coated polyester sheets to reduce friction and electrostatic charges.

LEAF AND SPRING ASSEMBLY: (Pressure pad assembly) insures good contact between the tape and the tape heads. A foam pad can twist and turn under rapid tape motion, thus resulting in drop-outs and poor frequency responses. Foam pads can also become gummy due to the buildup of oxide, dirt, and oil, thus causing the tape to stick to the pad. Felt pads may be more effective and durable.

HUM SHIELD: is a metal piece that helps to insulate the tape from stray electronic signals produced in the machine. It also protects the tape pack and the head from any extraneous feedback or hum that could generate distortion.

HUBS: hold the tape, maintaining the uniformity of the surface that the tape is against. Irregularity or damage to the shape of the hub can cause a bulge in every layer of tape; this may cause distortion and hinder smooth tape movement. The tape should not squeak and drag when it is being played.

ROLLER GUIDES AND PINS: Some cassettes have roller guides, some use plastic pins, and some have guides with stainless steel pins. Roller guides with pins are the most effective in reducing friction and insuring good tape path movement.

SCREW ASSEMBLY: allows the case to be taken apart for retrieval and repair of tape. Cheaper tapes usually do not have this feature and the cassette shell must be broken in order to retrieve a tape.

WINDOW: allows monitoring of the tape and keeps dust out. Uneven, cinched tape or scattered up and down patterns on the reel indicate problems.

TAPE: is silicon lubricated or otherwise treated to reduce friction. The oxide should be of the high density type on a polyester backing. Tape should not flake easily; in general the thicker the tape, the less stretch during high speed duplication.

D. HIGH SPEED DUPLICATION

Most lab operations depend on the use of high speed duplication to provide tapes for student use. Although generally a simple process, it is important to know the procedures that should be followed, some of the problems that may occur, and some possible solutions for those problems.

1. Use a good quality cassette in preparing masters and copies.

Cheap cassettes can have an irregular oxide applications and that acts like sandpaper across the recording heads. The 20-cent savings on a cassette of inferior grade is not worthwhile when it will contribute to the deterioration of a \$50 recording head. Furthermore, a high-quality tape is better suited to withstand the mechanics of high-speed duplication which requires a cassette that was originally designed to play at 1 7/8 ips to run at speeds up to 30 ips.

2. Preserve the master/original copy.

According to Telex brochures, a master cassette maintains peak performance during high speed duplication only up to 25 runs, after which physical deterioration begins to occur. To prevent the loss of programs, make several "working masters" (duplicated from the originals). The sound difference of this generation of tape should not be discernible to the language student.

3. Erase all cassettes before high speed duplication.
New tape can pick up noise from machines and motors during shipment. Since some models of duplicators do not have erase heads and those that do cannot reduce all of this noise completely, it is preferable to erase all tapes before duplication.
4. Rewind all cassettes before use.
Rewinding a cassette (even a new one) before use is a quality control step which restores an even, round tape pack. An egg-shaped settling of a cassette during shipment results in a jerking tape motion across the recording head during duplication (uneven rewinding of used cassettes may indicate an alignment problem with a student machine).
5. Use cassettes of the same length for master and copy.
A short copy cassette will lose some of the program at the end of side a and the beginning of side b. Avoid recording from leader tape to leader tape, since time designations may vary within brands. In addition, some machines require more time to get up to speed than others which causes some distortion.
After cassette preparations, the machines should be examined for possible problems. All components of any systems must be compatible. Although the duplicator is being discussed, the same features on the master recording machine require more time to get up to speed than others which causes some distortion.
After cassette preparation, the machines should be examined for possible problems. All components of any system must be compatible. Although the duplicator is being discussed, the same features on the master recording machine and the playback machine must be examined, cleaned, aligned, and demagnetized. If these steps are followed, and a good cassette is used, then the end product is a good copy.
6. Keep the tape path clean.
Successful duplications requires good tape-head contact. An impediment to this contact is dirt--which can be drawn across the head, causing scratches on the head face and premature wear. Every cassette run produces dry shed--oxide builds-up on the tape path, which inhibits good recording. Dust and dirt collections can also lose sounds. A recommended procedure is to clean the tape guides, the tape heads, the capstan shaft, the pressure rollers, and the tape lifters regularly with a good cleaner and a cotton swab. Use dust covers when the equipment is not in use.
7. Demagnetize the tape recording path.
Magnetism builds up on all the areas where recording tape touches the recorder but is a problem only in the head are, because it creates static and popping noises on the copies. Follow the instructions which come with the demagnetizer (a small one costs about \$30.00). The instructions

are to move the pole of the demagnetizer slowly up and down, very close and parallel to each head gap, but never touching it, and then to move the demagnetizer carefully away from the machine. A safety precaution: keep the demagnetizer away from recorded materials. All equipment used for mastering, duplicating and playback should be checked on a regular schedule for azimuth, zenith, bias, and head height. All heads should also be checked using a recorder are out of alignment, the machine still records and plays back, but that recording on a duplicator will produce poor copies.

8. Check the duplicators for azimuth: the perpendicularity of the tape head to the tape path.

The full width of the tape must pass squarely across the micro-inch gap in the recording head. This head must be perpendicular to the tape path. Check Telex manuals for engineering data. Each manufacturer has test tapes. Briefly, the instructions are to connect the output of the tape recorder or duplicator to a AC volt meter, and to turn the azimuth adjustment screw until the maximum output is shown. Incorrect azimuth will cause a loss of high frequency response.

9. Examine for correct zenith.

This measurement includes "tilt" which insures that the tape lies flush against the recording head with equal pressure on both the top and bottom edges (side a and side b), "tangency" which assures that the tape contacts the portion of the hyperbolic face of the head containing the gap, and "contact" which is the movement to or away from the tape. To detect a zenith problem, listen for one side of a copy to be better than the other when using a good master, good quality machines have a zenith adjustment.

10. Test for bias.

Bias is a high energy frequency that enables the audio signal to be recorded onto the iron particles of tape. Each manufacturer agrees to meet a nominal bias standard: Telex uses TB-18, 3M uses tape 2771. Without correct bias, a recording will be low or sibilant, and distorted. There are external adjustment controls on duplicators/copiers. If the tape sounds hissy, increase the bias; if the tape sounds muddy decrease the bias.

11. Measure head height.

Head height is part of azimuth and is the verticle relationship between tape and recording gap. If head height is off, crosstalk occurs. Head height is not adjustable; but the tape guides which move up and down are adjustable.

12. Replace worn parts.

Recording elements will need to be replaced on a regular basis under heavy operations. The need for head replacement is sometimes indicated by extensive penetration into the cassette; this is not an adjustable feature.

Readings:

Bryan Lanser and Williams Johnson, "High Speed Duplication," MIX vol. 9, no. 12d, December, 1985.

Tom Johnson, AUDIO TAPE DUPLICATING, Telex Communications, Inc., 9600 Aldrich Avenue South, Minneapolis, MN 55420.

Finn Jorgensen, HANDBOOK OF MAGNETIC RECORDING, Tab Books, Blue Ridge Summit, Pa. 17214, 1970.

TECHNIQUES FOR KEEPING QUALITY AUDIO MASTERS

A. Working masters on cassettes for high speed duplication.

1. at least two c-60's for active use, thereby providing a quick replacement if one is damaged without going back to the reel master or ordering the set again
2. start each side with instructions, not the middle of an exercise so students can find their place quickly, unlabelled tapes can be identified, and indexing is simplified.
3. masters are recorded one track at a time to catch time variations in different batches of cassettes.
4. check for quality and content, don't assume it's o.k. Murphy's Law is active in language labs.
5. make new working masters each year to insure quality audio recordings.
6. on commercial programs, eliminate the copyright statement after the first chapter if editing is necessary or combining tapes is important.
7. if appropriate, combine commercial tapes (if chapter one is on three cassette sides and only fills a third or a half of each side, combine the material onto two full length cassette sides to save storage space duplication time for students.
8. label the cassette with appropriate information to match printed material containing the copyright information and series breakdown.

B. Catalogues

1. each textbook/source should have a breakdown of chapter contents per tapes/cassette
2. double check for problems.
3. update yearly if appropriate.
4. copies to departments for files or to the instructor.

C. Locally produced materials

1. encourage teachers to prepare an introduction for the beginning reel.
2. help teachers place the taped materials, insuring that the tape for the students to respond, that the tape is technically good and with duplicating, and that the ending is indicated for students.
3. label the recorded materials at the beginning of each reel and box to aid identification/filing later.

4. use leader tape between lessons if recorded in single track reels.
- D.
1. remember cassettes are not permanent, treat them as expendable supplies.
 2. if a problem with cassettes develops, discard it as soon as possible, do not continue to record valuable information on a damaged cassette, and be very careful about putting a damaged cassette in a high speed duplicator.