TEFL Audio-visual Technnology Tools

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David John WOOD

The audio-visual approach in Teaching English as a Foreign Language employing technology is many decades old. Even with only reel to reel films, the ability to bring so many kinds of living language into a classroom empowered and augmented the potential of the language teacher. It was not until the 1970s, however, that control over these media improved sufficiently through Beta and VHS cassette tape recording and playback to enable the employment of substantial materials and more sophisticated methodologies. Over two decades later, the advent of DVD has created the same impact by revolutionizing the scope of audio-visual teaching again.

This is an overview of the essential elements of the media that defines the present generation. It is hoped that this description encourages improved instruction for the new generation of foreign language learners. Teachers can use DVDs more effectively by researching both the nature of this technology and the various aspects of the software that exist. What follows is a quick reference overview of this medium as it appears on the Internet (see especially http://disca-id.co.jp/dvd/dvdfaq_j.html). Studies on methodology and materials are also listed in the References.

The quality of DVD technology equals if not exceeds that of theater sound. Indeed, picture quality can even be superior to that of film theaters. Compared to ordinary VHS cassette tapes, DVDs are smaller and lighter, but stronger and longer lasting. DVDs can be dual layered and double sided and store more information (according to the content, up to 300 not 3 hours). This accounts for both the unrivaled quality and vast potential for including more than a movie itself. All kinds of information are possible from a wide choice of sound and caption channels (for subtitles, different languages and so on) through voice over commentaries by actors and directors, to documentary type shorts of the making and origins of a movie, offering fascinating historical and artistic insights. In addition there are trailers, interviews, production stills, missing or deleted scenes, special effects, trial footage, screen tests, isolated sound tracks, games, trivia, scripts, and so on. Advanced features extend the possibilities of control beyond what was previously imaginable.

DVD is a form of optical disc storage technology serving home entertainment, computers, and business information with a single digital format. It virtually replaced laserdisc and videotape to become the most successful consumer electronics product of all time soon after its introduction. DVD player sales have surpassed those of video cassette recorders to become the new standard for video publishing. DVDs can be used in a player or computer. In simple terms, every piece of a picture or sound is a certain color or tone to which a number is assigned and stored in a computer

so that every copy produced can be near perfect. Compressing the code means only having to record the number once in a series when the color or sound is the same. Movies usually contain about 200,000 pictures.

Not only identically colored or sounding individual pieces are compressible, whole frames or parts thereof can also be repeated. A DVD disc stores all the information for a movie picture and sound in this way. DVD video is usually encoded from digital studio master tapes to MPEG-2 format. The encoding process uses a form of compression that removes redundant information. The result may contain visual flaws. Higher data rates result in higher quality, with almost no perceptible difference from the master. To watch a movie, a player converts the numbers back into picture and sound.

Most TVs have the sharpness set too high for the clarity of DVD. This exaggerates high-frequency video and causes distortion, just as the treble control set too high on a stereo causes the audio to distort the sound. For best quality the sharpness control should be set very low. Brightness should also not be set too high. Japanese standard DVD players output video with a black-level setup different to the US standard. On TVs that are not properly adjusted this can cause diminishment in dark scenes. There may be an option in a player's menu to use standard black level. DVD video has exceptional color reproduction, so poor colors are almost always a problem in the display (or the original source), not in the DVD player or disc.

DVD audio quality is superior, including the option of PCM (pulse code modulation) digital audio with sampling sizes and data rates higher than audio CD. Alternatively, audio for most movies is stored as discrete, multi-channel surround sound using Dolby Digital or Digital Surround audio compression similar to the digital surround sound formats used in cinemas. As with video, audio quality depends on how well the processing and encoding was done. In spite of compression, Dolby Digital and Digital Surround (DTS) can be close to or better than CD quality.

Motion picture studios control the timing of the release of individual movie copies in different countries as theater releases are not simultaneous (a movie may come out on video in the United States just as it is being released in cinemas in Europe or Asia, and vice versa). Also, studios sell distribution rights to different foreign distributors to guarantee an exclusive market. Therefore they require that the DVD standard include codes to prevent playback of certain discs in certain regions. Each player is given a code for the region in which it is sold. The player may not play discs that are not coded for its region. A disc bought in one country is sometimes unplayable on a player bought in another. Many believe this is unjustifiable.

Regional codes are entirely optional for the maker of a disc. Discs without region locks will play on any player in any country. So far almost all Hollywood releases play in only one region. Region codes are a permanent part of discs. There are eight classifications and players and discs

are often identified by their region number superimposed on a world globe. If a disc plays in more than one region it will have more than one number on the globe. The major regions are: (1) U.S. and Canada; (2) Japan, Europe, South Africa and the Middle East; (3) Southeast and East Asia; (4) Australia, Pacific, Central and South America; (5) Eastern Europe, India and the rest of Africa; (6) China; (7) Reserved; and, (8) Airplanes.

Technically there is no such thing as a region zero disc or player but there are all-region discs and players. Some players can be modified using special command sequences from the remote control to switch regions or play all regions. They may also be modifiable to play discs of any regional code, not illegal in most countries. Many retailers sell players that have already been or can easily be altered for multiple region use. Imported players or players bought abroad are other options. All the necessary information can be found on the Internet. In addition to region codes, there are also differences in discs for NTSC and PAL TV systems.

DVDs typically offer 2 hours of high-quality digital video, support for widescreen movies, 8 tracks of digital audio (for multiple languages, or commentaries) each with as many as 8 channels and 32 subtitle tracks, automatic seamless branching of video (for multiple story lines on a disc) up to 9 camera angles (for different viewpoint selection during playback) on-screen menus and simple interactive features (for games and quizzes) instant rewind and fast forward, instant search to title, chapter, music track and time-code, and are insusceptible to magnetic fields and resistant to heat. Most discs do not contain every feature as each must be specially authored. Players usually support a standard set of features as follows: language choice (for automatic selection of video scenes, audio/subtitle tracks, and menus), special effects playback (freeze, step, slow, fast, and scan), programmability (playback of selected sections in a desired sequence), random or repeat play, digital audio output (PCM stereo and Dolby Digital), output of DTS audio tracks plus playback of audio CDs. Some players include additional features: component video output for higher quality picture, progressive-scan component output for highest quality analog picture, digital video output for perfect digital picture, reverse single frame stepping, reverse play at normal speed, multilingual on-screen display and digital zoom (a player not a DVD disc feature).

A dual-layer disc has two layers of data, one translucent so that the laser can focus through it and read the second layer. Since both layers are read from the same side, a dual-layer disc can hold almost twice as much as a single-layer disc, or about 4 hours of video. (Layer switching may cause temporary signal freezing.) DVD specifications require that players and drives read dual-layer discs. All players and drives also play double-sided discs if you flip them over.

Video on a DVD is stored in digital format, but is formatted for one of two mutually incompatible television systems, NTSC or PAL/SECAM. Accordingly, there are two kinds of DVDs. Some players only play NTSC discs, others play both. NTSC is used in Canada, Japan, Mexico,

Philippines, Taiwan, United States, and other countries. PAL is used in most of Europe, most of Africa, China, India, Australia, New Zealand, Israel, North Korea, and other countries. As these do not match regional coding, a number of problems can arise.

Almost all DVD players sold in PAL countries are multi-standard and play both kinds of discs. Most PAL TVs can handle both signals. Some players have a switch to choose PAL or NTSC. Because the quality of conversion in DVD varies, using PAL output with a compatible TV provides a better picture than converting from NTSC to PAL. Sound is not affected by video conversion. Most NTSC players cannot play PAL discs, and most NTSC TVs do not work with PAL video.

Closed Captions (CC) are encoded text on NTSC TV signals displayable via a built-in or a separate decoder. Nearly all US TVs have Closed Caption decoders. Closed Captions can be carried on DVD, videotape and TV. Captions commonly refer to on-screen text specifically designed for hearing impaired viewers, while subtitles are 100% transcriptions or translations of the dialogue. Captions are usually positioned below the person who is speaking, and include descriptions of sounds and music. Closed captions are not visible until the viewer activates them. Open captions are always visible, such as subtitles on foreign videotapes. Closed Captions on DVDs are automatically sent to the TV. You cannot turn them on or off from a DVD player. Subtitles, on the other hand, are a kind of DVD picture superimposed on the screen. These sub-picture tracks can be turned on to show them on top of the video. Sub-pictures can also be used to create captions. To differentiate from NTSC Closed Captions and subtitles, captions created as sub-pictures are usually called “captions for the hearing impaired.” Not all DVDs have Closed Captions or subtitles. Also, some DVD players do not reproduce Closed Captions at all.

There is a single DVD standard. However, within it there is a great deal of variation in the way that discs can be created. Different studios have come up with their own names for the advanced features that they offer. These kinds of advanced DVDs should play on most players but reveal more player problems than standard discs do. Some DVDs use a high data rate for the video to improve picture quality. Additional language tracks and other extras are left off the disc to make room for more video data and for a DTS audio track. In most cases the difference is subtle, but improves the experience on high-end players and progressive-scan displays. Other DVDs let you watch a movie with pop-ups that direct you to extra content such as an interview, behind-the-scenes-footage, or historical information.

DVD recorders can outlast VCRs because they are inexpensive, but dual VHS/DVD deck combinations exist for various applications. DVDs have many advantages over tapes, such as no rewinding, quick access to any part of a recording, and a fundamentally lower technology cost for hardware and disc production. DVD recorder sales have surpassed VCR sales. By 2010 VHS may be as dead as vinyl recording was in 2000. Most DVD players can play Video CDs. Standard VCD

players cannot play DVDs.

Standard DVD players will not play laserdiscs, and you cannot play a DVD disc on any standard laserdisc player. (Laserdisc uses analog video, DVD uses digital video; they are distinct formats.) At first many people wondered if DVD would replace laserdisc, the 12-inch optical disc format that has been around since 1978. After DVD was released, it soon became clear that it had doomed laserdisc. Laserdisc still fills a role in education, training, and video facilities, but it is disappearing even there. Existing laserdisc players and discs will be around for a while, though essentially no new discs are being produced. There are still rare titles available on laserdisc that are not on DVD. While some movies on laserdisc may never appear on DVD, DVD is superior to LD in many ways such as capacity, convenience, player quietness, picture quality, availability, price and so on.

High-definition TV has five times the resolution of standard TV (double vertical, double horizontal and wider aspect). DVD has not been able to support HDTV video content, but HDTV will not make DVD obsolete. It will take years before even a significant percentage of homes have HDTV sets. HDTV sets include analog video connectors (composite, s-video, and component) that work with all DVD players and other existing video equipment such as VCRs and provide a much better picture than any other prerecorded consumer video format, especially when using players with progressive-scan. Since the cheapest route to HDTV reception will be HDTV converters for existing TV sets, broadcast HDTV for many viewers will look no better than DVD. HDTV displays support digital connections. Digital connections for audio and video provide the best possible reproduction of DVDs, especially in widescreen mode. Gradually, DVD formatting will be upgraded to an HD DVD format.

Web DVD is the simple but powerful concept of combining DVD content with Internet technology. It combines the best of DVD (fast access to high-quality video, audio, and data) with the best of the Internet (interactivity, updates, and communication). In general, Web DVD refers to enhancing a DVD with HTML pages, links and scripting, or enhancing a Web site with content from a local DVD drive. Variations are known as iDVD, eDVD, Connected DVD, and so on. It has been done with CD-ROM for years, but the differences with DVD are that the quality of the audio and video are better than TV, and discs can be played in low-cost set-top players. Almost all Web DVD implementations are for PCs, but some new DVD players do have them. D-VHS, the digital successor to VHS tape, was first announced in 1995 but was initially limited to Japan. At the time, D-VHS decks could only record pre-encoded bit streams such as from a digital satellite receiver. In 2001 a D-Theater format was released, standardizing MPEG compression and copy protection and paving the way for the release of pre-recorded movies on D-VHS tape in 2002. D-Theater became the first format for viable commercial distribution of movies in high-definition. The quality is

excellent, but consumers prefer discs instead of tapes, so D-VHS will never rival DVD's popularity. Though HD DVD began to arrive in 2003, consumers are waiting for the next generation of DVD for pre-recorded movies and for home recording of HD programs.

DVD players have up to three kinds of video output (composite, s-video, and component) and four kinds of audio output (analog stereo, digital PCM stereo, Dolby Digital, and DTS). Most DVD players' video output connections can carry an NTSC, PAL, or SECAM signal. S-video carries brightness and two combined color signals. Composite video combines all three video signals into one. Some players may have additional video connections like component interlaced or progressive analog video which keeps all three video signals separate. As for video hookups, there are: S-Video (better than composite video and is only slightly inferior to component video) which almost all DVD players have; Composite Video (average quality); Component Video (excellent quality); and, Progressive Video which has even better quality because it preserves the progressive nature of most movies, providing a film-like, flicker-free image with improved vertical resolution and smoother motion.

As for interactive features, DVD players support a command set that provides simple interactivity. The main feature is menus present on almost all discs to allow content selection and feature control. Each menu has a still or motion background and up to 36 rectangular "buttons". Remote control units have up/down/left/right arrow keys for selecting onscreen buttons, along with numeric keys, a select (enter) key, a menu key, a top menu (title) key, and a return key. Additional remote functions may include freeze, step, slow, fast, scan, next, previous, audio select, subtitle select, camera angle select, play mode select, search to program, search to part of title (chapter), search to time, and search to camera angle. These features can be disabled by the producer of the disc, commonly used to lock viewers into the copyright warning or movie previews at the beginning of the disc, or to keep users from changing audio or subtitle tracks during the movie.

Additional features of the command set include simple mathematical applications, plus comparisons of various kinds and registering, such as language code, audio and sub-picture settings, and parental level. There are 16 general registers for command use. A countdown timer is also provided. Commands can branch or jump to other commands. Commands can also control player settings, jump to different parts of the disc, and control the presentation of the functions mentioned above. The command set enables relatively sophisticated discs, such as games or interactive educational programs. DVD content is broken into titles (movies or albums), and parts of titles (chapters or songs). Titles are made up of cells grouped into programs and linked together by one or more program chains which can be one of three types: sequential play, random play or shuffle play. Individual cells may be used by more than one chain, which is how parental management and seamless branching are accomplished: different chains define different sequences through mostly

the same material. Additional material for camera angles and seamless branching is interleaved together in small amounts. The player jumps from one to the next, skipping over unused angles or branches, to stitch together the seamless video. Since angles are stored separately they only affect the playing time. One problem is that adding a camera angle for a program roughly doubles the amount of space needed, cutting the playing time in half.

There are two main ways to display video: interlaced scan or progressive scan. Progressive scan, used in computer monitors and digital TVs, displays all the horizontal lines of a picture at one time as a single frame. Interlaced scan, used in standard TV formats (NTSC, PAL, and SECAM), displays only half of the horizontal lines at a time (the first field, containing the odd-numbered lines, is displayed, followed by the second field, containing the even-numbered lines). The advantage of interlaced video is that a better result can be achieved with only half the bandwidth. The disadvantage is that the vertical resolution is essentially cut in half, and the video is often filtered to avoid various problems. Film and video cameras capture pictures differently, while projected film shows the entire frame in an instant. Progressive-scan displays trace a series of lines from top to bottom, but the end result is about the same. DVD is specifically designed to be displayed on interlaced-scan displays in virtually all television sets. However, most DVD content comes from film, which is inherently progressive. To make film content work in interlaced form, the video from each film frame is split into two video fields and encoded as separate fields in the MPEG-2 stream, but film and TV run at different frame rates. For PAL/SECAM display, the solution is to show the film frames at a slightly faster rate, and to speed up the audio to match. For NTSC display, it is to spread the frames across about 3 times as many fields by alternating the display of the first film frame for 2 video fields and the next film frame for 3 video fields, called 2-3 pull-down. For MPEG-2 encoding, repeated fields are not actually stored twice. Instead, a flag is set to tell the decoder to repeat the field. MPEG-2 also has a flag to indicate when a frame is progressive (when the two fields come from the same instant in time). For film content, the progressive frame flag should be true for every frame. The problems inherent in 2-3 pull down are that some film frames are shown for a longer period of time than others, causing jerkiness especially in smooth pans, and, if you freeze the video on the third or fourth video frame when there is motion in the picture, you will see two separate images combined in a flickering mess. Most DVD players avoid the second problem by only pausing on coherent frames or by only showing one field. (This is what the frame/field still option in the player's setup menu refers to.) Most DVD players are hooked up to interlaced televisions, so there is not much that can be done about distortions from film conversion.

As for lifespan, DVDs are read by a laser, so they never wear out from being played since nothing touches the disc. Pressed discs (the kind that movies come on) will probably last longer

than we will, anywhere from 50 to 300 years. For comparison, magnetic media (tapes and disks) last 10 to 30 years; high-quality paper can last 100 years or longer; and microfilm 300 years or more. Computer storage media often becomes technically obsolete within 20 to 30 years, long before it physically deteriorates. In other words, before the media becomes unviable it may become difficult or impossible to find equipment that can read it.

There are many databases on the Internet to search for DVD titles and related information. One of the best is the Internet Movie Database at www.imdb.com., which researches virtually every past movie and all kinds of industry data, like movie budgets and details about films in production. By chronicling everyone who ever worked on a film, the service has become a definitive directory of just about everyone from key grips to producers, actors and directors. Its success is built on the participation of site visitors submitting information to the database millions of times, like the web encyclopedia, Wikipedia. Users also debate material related to the hundreds of thousands of film titles detailed on the site.

DVDs account for about half of movie companies' revenue but sales are decreasing. However, high-definition DVD technical delays and a format war mean that DVDs remain their staple. Studios are delivering movies to consumers over the Internet, but sales are tiny in comparison. Rentals and video-on-demand, although growing, generate far smaller profit for studios than do store-bought DVDs. Meanwhile, they are trying everything they can think of to find lucrative alternatives. Technology seems to change, but conventional packaged goods remain popular. With most movies now on DVD, studios are running out of new material. Some studios repackage older hits into anniversary box sets and other promotions, but consumers may be tiring of that tactic. Movie studios have also been issuing DVDs closer to a movie's release date. This has led to highs in sales right after DVDs come out, but big drops later and more turnover on store shelves. For box office hit movies, nearly all DVD sales come in the first few weeks after their release.

Although Internet downloading and video-on-demand are becoming well established, DVDs will likely continue as number 1 for another decade. It is more profitable for movie companies when consumers buy discs. Consumers buy billions of dollars worth of DVDs a year, each sale making a profit several times higher than by other means. DVDs are easy to buy, easy to use and relatively inexpensive. Retailers love DVDs because they boost other sales, too. Customers who buy DVDs at supermarkets tend to spend twice as much per store visit because they also buy other things, for example, items to go with the movies. By 2010, high-definition DVD sales will still be half that of standard-definition disc sales. Some studios let people create DVDs of movies in their homes via an online movie-downloading site. One problem is that such movies generally have to be watched on computer screens, but the new service allows the movies to be seen on any TV connected to a DVD player. People like to watch movies in their living rooms, and this solves

their problem.

The new offering also includes the bonus material on DVD discs, like filmmakers' or actors' commentaries and extra scenes. Picture quality is lower and it takes about three hours to download one title. The studios are not yet allowing new releases to be sold in a form that can be copied to DVDs. Prices will be the same as films sold in the versions that could be downloaded only to computers. Even though many computers have drives that can burn DVDs, allowing users to burn their own copies of movies has been a legal and technical challenge. The system that is used to keep commercial DVDs from being copied is controlled by an agreement between electronics and production companies that does not allow it to be used for making discs in homes. Another service will shortly allow users to burn their own DVDs of movies.

In conclusion, the implications for TEFL are that instructors owe it to their students to understand as much about the technology of DVD as possible. DVDs offer a high degree of control as well as constituting a huge resource that will be around for years to come. Being unable to exploit this medium to the full would be a serious oversight. Movies and other authentic materials are popular with teachers and learners alike. However, to use these responsibly requires a considerable investment of time in acquiring expertise of how to best use the materials in the context of all the ways in which the medium can work.

References

http://discaid.co.jp/dvd/dvdfaq_j.html.

Internet Movie Database at www.imdb.com.

Wood D. J. Cinema English School Curriculum Teaching Method, Sony Pictures Japan, 1994.

Wood D. J. Film Communication: Theory and Practice in Teaching English as a Second or Foreign Language, Mellen Academic Press, US, UK, Canada, 1997.

Wood D. J. Video in English as a Foreign Language, Japan Association of Language Teachers 14.11, Japan, 1992.