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ABSTRACT

Quality is seen as a primitive characteristic of media, but one that can be manipulated in various ways. Since media vary in their "relating power," that is, their ability to involve students, standards of quality also may vary in the ways certain production technique parameters, such as lighting, sound, and exposure, are manipulated. Some media, such as video, are seen as having great relating power, and yet these require careful technique in order to keep the medium's inherent characteristics from generating unintended "messages," which in many cases become distracting noise. Specific techniques for maintaining high quality and, thereby, high effectiveness in the media of video, audio, and photographic slides and prints are discussed. (Author/CFM)

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## A Humanistic Approach to Quality in Media

James Heaton

You point to something as having Quality, and the Quality tends to go away. Quality is what you see out of the corner of your eye.  
Robert Pirsig: Zen and the Art of Motorcycle Maintenance.

As in the well known book by Robert Pirsig, quality often turns out to be a primitive consideration in judging composition, among other things. A judgement is made, based on the demonstrated mechanical competence of the student. Perfection in this alone would rate at least a C. Then "objective" criteria have to be applied to evaluate the content of the paper. But "objectivity" turns out to be just another bias, which also varies from one teacher to the next. Some papers can violate all the "objective" rules and still be evaluated as excellent. Judgement of quality is somehow more basic than the application of standard criteria. Quality can be equally primitive in judging teaching materials in non-conventional media. That is, after the authors have applied all the technical evaluation criteria, at some point we simply say it will work-- we've done our best. Finding that point may be a problem. Often, as a matter of practical fact, even if we haven't eliminated all the underexposed slides and fixed all the noisy tapes, we have to decide that if it works, it works. But it doesn't always work in the way predicted. On the other hand, if the editor says the material is perfect, and it doesn't work (which in the world of commercial materials is too often the case) it's a setback to education by being a faulty product and by disseminating faulty premises about quality, not to mention being a waste of time to produce. Then how do we measure the quality that makes something work?

In language teaching, we assume one has to be very specific about the message one is trying to get across via a teaching medium. The medium may be the teacher, some abstracted representation thereof ("teaching" texts, tapes, and pictures), blackboards and flashcards, or audiovisual material possibly used in the lesson as an information source. Whatever medium is used, the teacher always works under the assumption that the message being conveyed is the one he/she had planned for, namely an analyzed point of language skills, grammar, or culture, as it was realized in the lesson plan. We further assume, before testing, that if the lesson plan is well executed through the chosen media then the teaching points have, in principle, "gotten across". A highly evaluated lesson would then have quality-in-principle, or intrinsic quality. This is the part of language teaching that experienced professionals can control on the basis of acquired intuition about what goes into a high quality lesson. But, judging from the wide range of opinion about what constitutes a high quality lesson, we appear to know very little about defining the quality parameter. Followers of Rivers, Fries, Newmark, or Gattegno would have vastly differing quality evaluations of material for teaching grammar, for example. Yet, despite

their prejudices, most professional observers are able to recognize quality teaching when it occurs, many can produce it, and we can even manage to convey successfully some idea of it in the TESL program at UCLA. Therefore, there's no doubt that there is such a thing as quality in our classrooms. To define such a set of features of quality teaching--if one really needs to--one has to go back to Zen and the Art of Motorcycle Maintenance.

But rather than regard that particular rite of passage as a prerequisite to language teaching media, let's consider another, perhaps more pertinent aspect of the messaging process. Our real object in language teaching is extrinsic quality--otherwise known as effectiveness, or how well the student receives the message we've so carefully prepared. Sometimes we can measure this kind of quality by testing, but unfortunately we have not yet been very successful at measuring the kinds of qualities that really matter, such as might be characterized in questions like:

Is the student's attitude toward learning this language improved by this technique?

Will his/her language behavior be influenced by the technique six months from now?

What information is the student really deriving from this experience?

Though some information might be gained about the first two questions by the administration of questionnaires and by careful testing, the last question may be the really crucial one as regards the quality of the experience. In the dozens of Encyclopedia Britannica films we were shown during noon hours at Baldwin High School, on such subjects as "The American Savage", "Acne and You", and "Better Driving", the features I remember most are the warbly fanfare music at various histrionic moments in the films, the peremptory announcers, and the bad acting. These were features of the medium (along with the scratchiness of the film, the projector noise, the dark room, etc.), not the message about improving ones driving or face-washing habits. But these features were also inseparable from the message.

We do have some evidence that the medium is noticed by the students in our classes. In the first place, students are very much more likely to show up for a class if a presentation in a non-conventional medium such as film or slides is announced in advanced. Similarly, presentations of videotape receive rapt attention from the most boistrous class. Many students have even remarked that this was their first exposure to the videotape medium. Unfortunately, this doesn't yet say what the quality of playback material may be doing with this rapt attention. Boring lectures on videotape become ridiculous, and bad acting becomes an entertaining comedy routine.

But usually it's impossible for students to remain neutral to audio- or videotaped instructional units where they obtain feedback from their own performance. As in the following comments from Abby Sher's 103J experiment in

the Fall quarter of 1974, the act of being recorded evokes either panic or real involvement:

- Student A: When I saw myself on T.V. (and) I heard my voice, I noticed that I'm talking in low voice and pronouncing in a bad way.... I hate role playing....
- B: I didn't know that I was so fat. However I was quite pleased with my gesture and my voice.
- C: I was very surprised of myself. Generally I don't like to speak English loud. I am afraid of those mistakes.
- D: I think it was a great experience but I think for my English (it was) not too good because I was thinking (during the) play, and I didn't pay attention to my English.
- E: ....I had never the courage before to tape my voice, and now I was forced to. Everybody likes my accent.....

And it's comforting to note that these students responded with some of the same sorts of apparent irrelevancies that I did.

Perhaps, at this point, we can arrive at a working definition of quality in media and call it something like "relating power"--the degree to which the medium is able to communicate in a relevant way to the students. If a medium relates, it has probably crossed far enough over the teacher-student boundary to be effective, that is, to have extrinsic quality. Videotape is one example which has inherent relating power, almost independent of the message. The print medium is, in this day and age, at the opposite extreme, requiring a rather specialized audience possessing a highly developed reading skill in order for the printed message to have relating power comparable to other media. We are faced with the reality, then, that a piece of videotape--albeit badly shot, fuzzy, and full of irrelevant camera movement--may impress students much more indelibly than a story on a similar topic by John Steinbeck. Thus, we have the work of videofreaks who, laden with portable equipment and disdainful of the principles of motion picture photography, are making social documents that make the best newspaper feature articles seem as relevant as yesterday's dishwasher. The video product may not project anything like an intended message, but the intention, whatever it is, is created as one goes along. Sometimes, very good documentaries result from this approach.

"Instant" production creates message artifacts, however, which may be counterproductive. A shaky camera gives a misleading sense of insecurity to the situation, such as might be appropriate to a battlefield newsreel. A similar message and consequent misinformation results from poor focus and exposure, and from sound which is full of irrelevant noise. All these absorb attention at the expense of the intended message. In some playback situations, one considers such artifacts part of the "truth" of the image. But in language teaching classrooms, we cannot afford the breakdowns in effectiveness that spurious messages create. To properly harness the runaway effects of the video medium for educational purposes, then, one has to be even more careful about the conventional parameters:

1.) The script should be of appropriate content, length, and simplicity, and the material must be so packaged by the instructions, labeling, and editing that successful use of it in appropriate classroom conditions is almost an automatic procedure. This point has been discussed extensively elsewhere.

2.) The actors in a drama/narrative type of presentation should be well rehearsed to the point where they are at ease with the presence of the camera and can focus on a good and believable presentation of the material. Artifacts such as awkward pauses and embarrassed smiles communicate exactly that message.

3.) The camera person should be sufficiently well acquainted with the script to know when the camera needs to be moved and the focus or focal length changed. The shots and their exposure must all be delineated beforehand. Only in documentary photography, where unpredictable action is unfolding does one play it by ear--and good photographers always have strategies prepared even for this.

4.) Lighting is important and is almost always overlooked in the rather forgiving half-inch videotape medium. The present generation of cameras is sensitive even to the extent of producing a picture with ordinary room lighting. Such lighting may result in recognizable faces in fairly close-up shots. But, inevitable, the contrast range is poor, shadow detail is lacking, and the general impression is that the picture is "muddy". In addition, the resolution of the picture will be less than optimum, since low level lighting necessitates opening the lens aperture to nearly maximum. Quality production requires supplementary lighting in most indoor situations, and this can be provided by one or two hand-held quartz-halogen "sun guns" or by small photofloods. Whatever the light source, it should be behind or well above the camera position and located about 45 degrees to the camera axis. If there are windows in the room, they are a source of daylight illumination, and the camera must be aimed away from them.

5.) Sound quality is the third dimension of video and is directly related to microphone placement. This matter is frequently slighted, resulting in a relatively high background noise level. Microphones should be placed as close as possible to the actor(s) or hung around their necks, if possible. If the microphone can't be placed on the person or on a desk stand next to him/her, it should be aimed at the actor(s) by someone holding it at the nearest position off-camera. Other possibilities are hiding the microphone on the set, behind books, or in a newspaper or handbag next to the actor(s). If there is more than one sound source separated by more than ten feet or so, it will be necessary to use multiple microphones and a sound mixer, which combines the signals before they enter the recorder.

If the message is worth messaging, the video medium will then carry its own weight by virtue of its built-in property of projecting "electronic immediacy".

Other media, though they are less likely to project spurious messages, can be impeded by sources of "noise" which interfere with information transfer.

They generally have to possess much higher intrinsic quality than video in order to be effective. Audiotape is an example of a medium where the technology is far ahead of the available expert imagination to utilize it. The potential quality for voice recording inherent even in the popular cassette format is about as good in medium-priced home recording units as it is in the very best professional machines. Nevertheless, this potential realism and information content is seldom realized due to bad recording and playback conditions.

1.) As with video, the script and "packaging" must be appropriate in content, length, and format to the class for which it is intended.

2.) The recording location is the most important single factor, assuming the equipment is in basic working order. In audiotape recording of spoken "studio" material, excluding extraneous sound from the recording is extremely important. At the same time, it's necessary to record in sufficiently anechoic surroundings that the material doesn't sound like it is emerging from a storm sewer. Both factors can be controlled by recording in surroundings having some sort of sound insulation, however imprromptu. A closet full of clothes makes a very good substitute for a sound-insulated recording booth. Recording under a blanket draped over a chair back is another good method for reducing sound and quality distractions. Neither method is particularly inconvenient and either will considerably improve the finished product over the usual tinny and noise-ridden recording made in office or classroom surroundings.

3.) The microphone placement consideration of video recording applies even more to audio, since its message is all in the audio dimension. The microphone is placed within eighteen inches of the speaker's mouth and is aimed precisely at it. This, of course, assumes that you will be using a fairly good, directional microphone. The built-in microphone in some cassette recorders is an emergency convenience device only and is not recommended for making educational materials. It has poor frequency response and picks up a significant level of motor noise from the recorder itself.

If a greater bass effect is desired (low-priced microphones have little or no bass response at normal sound levels), the microphone should be placed as close as six inches from the speaker's mouth and covered with acoustic foam, while the speaker is instructed to direct his/her voice more across the microphone than directly into it, to avoid excessively plosive "pops".

4.) Mixing is necessary, as with video recording, if more than one sound source is involved. A common situation is mixing an auxiliary source, such as recorded music, with live voice. Verite recordings can also be constructed in this way by using recorded effects. Preliminary run-throughs, are of course, needed to get the timing of the material in the correct mutual relationship and to adjust relative levels. That is, you don't want the music to begin or end at the wrong times, and you certainly don't want it to be louder than the voice track.

5.) Tape format is an important parameter in the quality equation and is related to the type and amount of editing which will be required. Open reel-to-reel format is still generally the best and most flexible format for recording

the original. The signal-to-noise ratio--the lack of "muddiness" in the sound--is much higher with moderate-priced open reel machines than it is with comparably priced cassette apparatus, as is the steadiness of the speeds. And mechanical editing, the old cut-and-splice technique, still results in the best quality original, since it doesn't involve the additional generation of re-recording, as in electronic editing.

On other hand, cassette have the clear advantages of storability and material accessibility, as well as being exceptionally convenient from the equipment operation standpoint. One compromise is to make all original tapes in open reel format, edit them in this format and re-record the edited material onto cassette copies for classroom use. The original reel is kept in storage in case the copies are lost or damaged and need to be replaced in circulation. If one intends to have a library of materials where a high rate of utilization is a prime aim, then such an approach is called for.

A lower quality approach, but one which has a higher convenience rating, is making original recordings on high quality chromium dioxide ( $\text{CrO}_2$ ) cassette tape, with an appropriate recorder setting, or with a Dolby noise-reduction system. Classroom copies could then be made from an easily storable cassette original with somewhat improved frequency response and noise figures over standard cassette-to-cassette duplication.

Any tape duplication process is accomplished by wiring the high impedance ("aux" or "radio/phono") outputs and inputs, respectively, of the two machines together. The speaker-to-microphone type of tape duplication does severe violence to the recorded sound and is not recommended for any application.

Much more could be said about general factors which affect quality of sound recordings. For instance, all the above assumes that the playback apparatus is adequate for the classroom and that it is in a good state of repair. Frequently, cassette recorders are designed for "personal" use only, and have speakers and amplifiers which are entirely too small for playback more than five feet away. These cannot cover an entire room. Equipment is often allowed to accumulate dirt on the playback head, the capstan, and in the input and output jacks, which seriously affects sound in a variety of ways. Finally, the room itself may not be well designed for class use of sound materials. The walls of some rooms are acoustically so "hard" that destructive echoes are set up. Needless to say, this equally bodes ill for the students' being able to hear the teacher's voice. Noise interference from outside the classroom also affects--and, in the case of schools near an airport, may obliterate--sound quality. In such cases, and where different groups are working in the same room, it may be necessary to resort to some variant of the language lab format: headphones connected to a central console or used with individual cassette machines in a "library" tape check-out system. In any event, the quality of the environment must certainly be as important a factor as it is in video, slides, or other media.

The photographic medium--prints, slides, and instant polaroid snapshots

--also seems to have inherent properties which evoke an interest response, regardless of the message content. Large size (16" x 20", or larger) mounted prints of locations, cultural activities, or individual interactions have proved useful for composition starters. The use of appropriately selected slide programs also almost inevitably increases the students interest and participation in the study of a given instructional unit. Student participation in the making of "snapshot stories" and write-on filmstrips has been carried out with great success in public schools. At UCLA, cross-cultural teaching points in ESL classes are frequently reinforced with slide presentations furnished by the students. Such materials in which students have participated possess enormous relating power and, therefore, must be considered high in quality, where appropriately used--even though they are "only snapshots".

But materials designed for a library resource of more general use unfortunately can't always take advantage of the relating power that personalized class materials have. Then as the case of video, in order for the visuals to achieve their intended teaching objectives, they must be able to stand on the basis of their own inherent quality. If quality in video and sound materials made by teachers is dependent on a variety of parameters, including the nature of the classroom, quality in photographic materials is even more of a delicate matter. When one is dealing with a medium with the detail, color, projected size, and visual impact of photographic transparencies, one has the choice of either overwhelming the students with trash, or of creating lesson materials which can present well, effectively and efficiently a great range of subject matter.

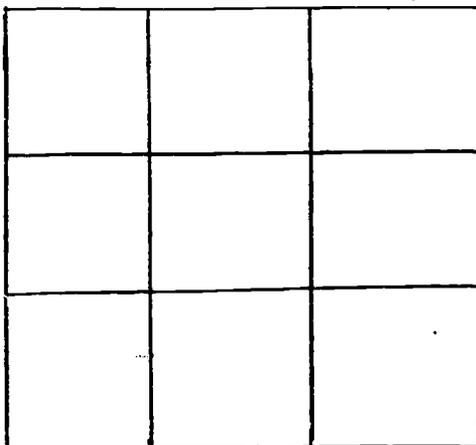
But there is a danger in the fact that taking a photograph is not in itself a painstaking process. You can easily project Uncle Fred and Aunt Martha to huge proportions, out of focus, and with the chimney in the background apparently sticking out of Aunt Martha's head. The image can have the size and general color range of the Sistine Chapel, but it took only five hundredth of a second to make. And every second, more pictures than Chagall or a Rembrandt produced in a lifetime are being created in this way. In painting, one has hours, days, and weeks to create quality in a picture. But, in photography, quality in the image demands looking at the subject and manipulating it carefully into a picture in the viewfinder before that five-hundredths of a second has been reached and passed. Even then, one can't be really certain what has just been recorded on the film. Learning to see how the picture is going to look and comparing that with how you want it to look are prime requisites to quality. Some of the conditions which must be met to achieve a slide presentation which possesses a high degree of relating power are:

- 1.) A carefully written script of appropriate length and carefully edited language content to which to fit the visuals. Though this is a given condition for any media presentation, slide scripts may require special types of scripting, depending on the type of lesson. Dialogue and narration lessons, where each picture denotes a step in the progressions of the action or in the development of the subject matter, require a script to key each slide to a given sentence or effect in the sound track.

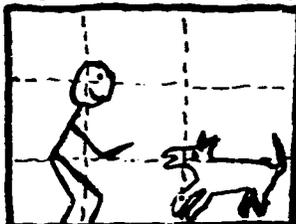
A collage lesson involves a much greater number of slides designed to depict the whole environment of a subject, such as pollution; Berkeley, California; the Sunset Strip milieu; or the Chicano subculture of East Los Angeles. At UCLA we have experimented with one such presentation, called "Old Friends" (by S. Ulm, N. Villoria, and D. Walker), which is concerned the problem of aging. The script consists of a guide to the use of the materials, the sound being the Simon and Garfunkle song, "Old Friends". Guidance for using the materials to generate discussion and composition on the cross-cultural point of the treatment of the aged is furnished, and other materials, a Time feature on senior citizens and a radio news feature (on the accompanying sound tape), are included in the multi-media package. The slides serve to create an information environment for the topic by showing old people in Santa Monica, while the lyrics of the song play in the background. Information about interpersonal relations, modes of dress, habitat entertainment, and attitudes are all included without other comment, in the visuals. Though this is not a non-conventional format, it is one which hitherto hasn't been applied significantly to second language materials.

2.) Simplicity in the picture composition and in the editing of the sequence of pictures is a principle for really controlling the message and strengthening it by eliminating distractions. In that five-hundredth of a second, it's rather easy to include a lot of material in a picture that doesn't belong to it, even though it's there in the real world. By the same token, it's easy to include a lot of slides in a given program that don't really add anything to the whole effort.

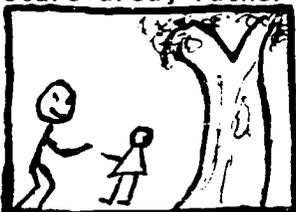
Simplicity in individual pictures is achieved mainly by accurate framing of the subject and by control or elimination of background detail. The act of framing entails getting close enough to the subject so that it fills the frame appropriately, and so that no other distracting detail is included. Lines and masses in the picture should also be balanced in a pleasing way. Mastering this aspect of composition might come naturally, or it might require several courses in photography. One rule of thumb which is worth remembering is the Thirds Rule, whereby the picture area is divided up like a tic-tac-toe game:



The main areas of interest should then fall near one or more of the intersections of the lines--not at the center or near the edges:



Similarly, people should be made to face slightly into (toward the center of) the picture and lines of trees, buildings, or the figures of people should tend to circulate within the picture area, rather than leading the eye out of it:



These rules were developed somewhere around the time of the Italian Renaissance and still apply to the best modern visual art. Since they make a picture say more, and do it with greater economy, they cannot be ignored in making good media lessons.

Editing should be ruthless in regard to simplicity, both from the basic standpoint of length and in keeping the subject matter clear and authentic. Length of language teaching slide presentations of the dialogue/narrative type is usually limited to 40-50 slides. to obtain the maximum attentiveness to the medium. Collage type slide programs tend to be longer, up to around 100 pictures, since there is usually greater variety and speed of presentation in the visual environment being created. Thus, one can photograph a lesson on less than two rolls of film, have plenty of room to eliminate pictures with incidental defects, and substitute duplicate shots.

The criterion of simplicity should not be used in such a way that the picture lose character. They must say visually what they mean linguistically, and, to do this, relevant characteristics of locations should be shown and facial expressions, gestures, and actions made full use of to reinforce the language. One of our best examples of striking a good compromise between simplicity and character is a lesson on the use of the conditional structure, "Lucy and Nancy in Hollywood", by Abby Sher. The two actors personify two different character types, a "positive" person and a "negative" person. Set against various Hollywood Blvd. locations, the characters try to decide what to do for entertainment, one trying to persuade the other and the other always coming up with an excuse: "We could play cards!" "But if we played cards, you would beat me." Facial expressions and body gestures are used in each picture to distinguish the attitudes of the two women. If these factors were not important, there would be no point in using pictures. A major cause of quality failure is the "anything" picture, where no character at all exists

to delineate meaning.

3.) It is also good professional practice to vary camera angles and distances from one shot to another so that the interest level of the program is maintained. Though this is a lower order criterion which should not allow the camera to get in the way of the message, a change of camera angle from the usual eyelevel position to a lower level may align the camera with a much more uncluttered background, e.g., the sky, behind the subject. By the same token, experimentation with moving the camera laterally can eliminate unwanted background. Another way of simplifying background will be discussed in the next section.

4.) Film type ties closely to the other important technical criteria of exposure and depth of field. For beginners, higher quality is likely to result from the use of a more light-sensitive material such as High Speed Ektachrome (a.s.a. 160), GAF 200 (a.s.a. 200) or Fujichrome (a.s.a. 100). Since each of these require relatively short exposures in daylight or bright interiors, they tend to be more forgiving of several types of errors. First of all, higher shutter speeds can be used, resulting in a lessened probability of camera or subject movement ruining the picture. Alternatively, higher film sensitivity (higher a.s.a. values) allows a smaller lens opening (f stop) to be used. This has the effect of increasing the distance through which lens is in focus. If, for example, the lens is set for 10 feet at f4, its "depth of field", for which images will be acceptable sharp, might be 9 feet to 11.5 feet. If the lens opening were decreased to, say, f11, and the shutter speed lowered to compensate, the depth of field would increase, so that the picture is now in focus from a distance of 6 feet to 17 feet.<sup>3</sup> Thus, focussing errors are less likely to create problems with a film with which small lens openings are the rule. Similar arguments apply to the use of a sensitive film for flash illumination.

A third quality advantage is that exposure latitude tends to be greater with more sensitive films. That is, the inherent contrast (difference between the rendering of light and dark areas) is less, and the allowable exposure error for acceptable results is increased.

But, as more experience is gained, it may be desirable to experiment with a less sensitive film, such as Kodachrome 64 or 25. It is often valuable, for simplification, to be able to limit depth of field, as well as to extend it. For example, if distracting background detail or textures cannot be eliminated from the picture by altering the camera angle, decreasing the depth of field will at least cause the background to go selectively out of focus, while the subject area remains sharp. This strategy is most useful for a subject area consisting of people and objects fairly near (up to 15 feet) the camera. If a less sensitive film is used, the lens opening can be made wider than is often possible to accomplish the same reduction of depth of field to "fuzz out" the background by increasing the lens opening and compensating with a higher shutter speed.

Another quality advantage of "slower" film is its property of reducing the picture's "grain" characteristics. Any photographic film depends on fine particles of silver halide to act as the light-sensitive agent. Since these

particles are of finite size, they limit the image-resolving power of the film, and can be seen in the developed image as tiny dots or lumps. In a fine grain film, usually of lower sensitivity, these dots are smaller, and consequently the reproduction of detail is more impressive. While the grain characteristics of modern high sensitivity films are quite adequate for projection, less sensitive and finer grain films lend themselves better to low contrast types of conditions, where grain becomes very apparent, or to making slides under controlled lighting conditions which are intended for duplication.

5.) Lighting is another parameter which must be dealt with in understanding photographic quality. While most fast films are also very forgiving, one still needs to develop an awareness of what the film will see, rather than what appears to the idealizing eye. Fluorescent lighting appears white to most people's eyes. It appears bluish-green to High Speed Ektachrome and a slightly darker green to Kodachrome 64. "Objective" reality isn't always seen the same by different films, but normal incandescent lighting is yellow and is so rendered by any color film. Outdoor light in open shade comes mainly from the sky and is therefore blue. Light reflecting from grass or buildings tends to take on the color of the reflecting medium. Whether or not the light color is compatible with the intended result needs to be kept in mind when setting up the picture. In any event, lighting errors shouldn't be allowed to contribute to the "noise" of the picture.

Without going into the details of good photographic lighting, a good rule to follow is that, given the correct exposure, diffused lighting tends to produce better results than harsh, direct lighting. In Los Angeles, the smog and natural haze tends to help us in this respect, so that lighting which produces too great contrast is seldom a problem except at the beach. Cloudy days generally provide good shooting conditions. Otherwise, white cardboard reflectors should be used to balance strong sunlight and to "open up" shadows on people's faces. If a neutral-colored building wall is at hand, it can be used as a natural reflector.

The proper aim, then, of any media work is to create a product which will communicate the intended message with the greatest amount of clarity and the least non-communicative noise, using the inherent impact of an appropriate medium. This is how we work out the quality of relating power.

These are only a few major factors which I, as one humanist, have found to be crucial to quality in this cross section of media. There are others. Indeed there are other media which have not been fully explored yet which may have more relating power to contribute than any so far considered. Possibilities seem to lie in the areas of computer-assisted language instruction of the flexible PLATO type, individualized use of the cassette videotape format, and holography.

We have only discussed the whole-class application of media. It may be that real quality can't be achieved in such an environment due to the variety of students needs and responses to teaching media. Classes tend to be heterogeneous in skill levels, and the winds of change seem to be indicating that some form of individualized--though not necessarily programmed--instruction

may be the most effective. Since such forms of instruction generally involve a heavy capital outlay for equipment and materials, school administrations, having been stuck previously with language lab white elephants, are understandably reluctant to sally forth into innovative areas of self-instruction. But there comes a time when we have to unglue our eyes from the rear-view mirror and look at new technology with the question "Will it help provide the best possible instruction?" That's, after all, the only cost effectiveness question that matters.

#### FOOTNOTES

<sup>1</sup>"Audiovisual ESL" in Introduction to the Teaching of English as a Second Language, eds, M. Celce-Murcia and L. McIntosh. Prepub. ed. UCLA, 1975. pp. 315-329

<sup>2</sup>Some examples of the animated film approach to collage, which are adaptable to ESL are given in the Bibliography.

<sup>3</sup>Depth of field is always a bit greater beyond the nominal focal point (the number indicated on the focussing ring of the lens) than it is on the near side. Otherwise, we could simply say the depth of field increased from 10 feet plus-or-minus one foot to 10 feet plus-or-minus four feet. The depth of field figures are engraved on the focussing rings of most cameras.

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## A Humanistic Approach to Quality in Media

James Heaton

You point to something as having Quality, and the Quality tends  
to go away. Quality is what you see out of the corner of your eye.  
Robert Pirsig: Zen and the Art of Motorcycle Maintenance.

As in the well known book by Robert Pirsig, quality often turns out to be a primitive consideration in judging composition, among other things. A judgement is made, based on the demonstrated mechanical competence of the student. Perfection in this alone would rate at least a C. Then "objective" criteria have to be applied to evaluate the content of the paper. But "objectivity" turns out to be just another bias, which also varies from one teacher to the next. Some papers can violate all the "objective" rules and still be evaluated as excellent. Judgement of quality is somehow more basic than the application of standard criteria. Quality can be equally primitive in judging teaching materials in non-conventional media. That is, after the authors have applied all the technical evaluation criteria, at some point we simply say it will work-- we've done our best. Finding that point may be a problem. Often, as a matter of practical fact, even if we haven't eliminated all the underexposed slides and fixed all the noisy tapes, we have to decide that if it works, it works. But it doesn't always work in the way predicted. On the other hand, if the editor says the material is perfect, and it doesn't work (which in the world of commercial materials is too often the case) it's a setback to education by being a faulty product and by disseminating faulty premises about quality, not to mention being a waste of time to produce. Then how do we measure the quality that makes something work?

In language teaching, we assume one has to be very specific about the message one is trying to get across via a teaching medium. The medium may be the teacher, some abstracted representation thereof ("teaching" texts, tapes, and pictures), blackboards and flashcards, or audiovisual material possibly used in the lesson as an information source. Whatever medium is used, the teacher always works under the assumption that the message being conveyed is the one he/she had planned for, namely an analyzed point of language skills, grammar, or culture, as it was realized in the lesson plan. We further assume, before testing, that if the lesson plan is well executed through the chosen media then the teaching points have, in principle, "gotten across". A highly evaluated lesson would then have quality-in-principle, or intrinsic quality. This is the part of language teaching that experienced professionals can control on the basis of acquired intuition about what goes into a high quality lesson. But, judging from the wide range of opinion about what constitutes a high quality lesson, we appear to know very little about defining the quality parameter. Followers of Rivers, Fries, Newmark, or Gattegno would have vastly differing quality evaluations of material for teaching grammar, for example. Yet, despite

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their prejudices, most professional observers are able to recognize quality teaching when it occurs, many can produce it, and we can even manage to convey successfully some idea of it in the TESL program at UCLA. Therefore, there's no doubt that there is such a thing as quality in our classrooms. To define such a set of features of quality teaching--if one really needs to--one has to go back to Zen and the Art of Motorcycle Maintenance.

But rather than regard that particular rite of passage as a prerequisite to language teaching media, let's consider another, perhaps more pertinent aspect of the messaging process. Our real object in language teaching is extrinsic quality--otherwise known as effectiveness, or how well the student receives the message we've so carefully prepared. Sometimes we can measure this kind of quality by testing, but unfortunately we have not yet been very successful at measuring the kinds of qualities that really matter, such as might be characterized in questions like:

Is the student's attitude toward learning this language improved by this technique?

Will his/her language behavior be influenced by the technique six months from now?

What information is the student really deriving from this experience?

Though some information might be gained about the first two questions by the administration of questionnaires and by careful testing, the last question may be the really crucial one as regards the quality of the experience. In the dozens of Encyclopedia Britannica films we were shown during noon hours at Baldwin High School, on such subjects as "The American Savage", "Acne and You", and "Better Driving", the features I remember most are the warbly fanfare music at various histrionic moments in the films, the peremptory announcers, and the bad acting. These were features of the medium (along with the scratchiness of the film, the projector noise, the dark room, etc.), not the message about improving ones driving or face-washing habits. But these features were also inseparable from the message.

We do have some evidence that the medium is noticed by the students in our classes. In the first place, students are very much more likely to show up for a class if a presentation in a non-conventional medium such as film or slides is announced in advanced. Similarly, presentations of videotape receive rapt attention from the most boistrous class. Many students have even remarked that this was their first exposure to the videotape medium. Unfortunately, this doesn't yet say what the quality of playback material may be doing with this rapt attention. Boring lectures on videotape become ridiculous, and bad acting becomes an entertaining comedy routine.

But usually it's impossible for students to remain neutral to audio- or videotaped instructional units where they obtain feedback from their own performance. As in the following comments from Abby Sher's 103J experiment in

the Fall quarter of 1974, the act of being recorded evokes either panic or real involvement:

- Student A: When I saw myself on T.V. (and) I heard my voice, I noticed that I'm talking in low voice and pronouncing in a bad way.... I hate role playing....
- B: I didn't know that I was so fat. However i was quite pleased with my gesture and my voice.
- C: I was very surprised of myself. Generally I don't like to speak English loud. I am afraid of those mistakes.
- D: I think it was a great experience but I think for my English (it was) not too good because I was thinking (during the) play, and I didn't pay attention to my English.
- E: ....I had never the courage before to tape my voice, and now I was forced to. Everybody likes my accent.....

And it's comforting to note that these students responded with some of the same sorts of apparent irrelevancies that I did.

Perhaps, at this point, we can arrive at a working definition of quality in media and call it something like "relating power"--the degree to which the medium is able to communicate in a relevant way to the students. If a medium relates, it has probably crossed far enough over the teacher-student boundary to be effective, that is, to have extrinsic quality. Videotape is one example which has inherent relating power, almost independent of the message. The print medium is, in this day and age, at the opposite extreme, requiring a rather specialized audience possessing a highly developed reading skill in order for the printed message to have relating power comparable to other media. We are faced with the reality, then, that a piece of videotape--albeit badly shot, fuzzy, and full of irrelevant camera movement--may impress students much more indelibly than a story on a similar topic by John Steinbeck. Thus, we have the work of videofreaks who, laden with portable equipment and disdaining the principles of motion picture photography, are making social documents that make the best newspaper feature articles seem as relevant as yesterday's dish-water. The video product may not project anything like an intended message, but the intention, whatever it is, is created as one goes along. Sometimes, very good documentaries result from this approach.

"Instant" production creates message artifacts, however, which may be counterproductive. A shaky camera gives a misleading sense of insecurity to the situation, such as might be appropriate to a battlefield newsreel. A similar message and consequent misinformation results from poor focus and exposure, and from sound which is full of irrelevant noise. All these absorb attention at the expense of the intended message. In some playback situations, one considers such artifacts part of the "truth" of the image. But in language teaching classrooms, we cannot afford the breakdowns in effectiveness that spurious messages create. To properly harness the runaway effects of the video medium for educational purposes, then, one has to be even more careful about the conventional parameters:

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1.) The script should be of appropriate content, length, and simplicity, and the material must be so packaged by the instructions, labeling, and editing that successful use of it in appropriate classroom conditions is almost an automatic procedure. This point has been discussed extensively elsewhere.<sup>1</sup>

2.) The actors in a drama/narrative type of presentation should be well rehearsed to the point where they are at ease with the presence of the camera and can focus on a good and believable presentation of the material. Artifacts such as awkward pauses and embarrassed smiles communicate exactly that message.

3.) The camera person should be sufficiently well acquainted with the script to know when the camera needs to be moved and the focus or focal length changed. The shots and their exposure must all be delineated beforehand. Only in documentary photography, where unpredictable action is unfolding does one play it by ear--and good photographers always have strategies prepared even for this.

4.) Lighting is important and is almost always overlooked in the rather forgiving half-inch videotape medium. The present generation of cameras is sensitive even to the extent of producing a picture with ordinary room lighting. Such lighting may result in recognizable faces in fairly close-up shots. But, inevitable, the contrast range is poor, shadow detail is lacking, and the general impression is that the picture is "muddy". In addition, the resolution of the picture will be less than optimum, since low level lighting necessitates opening the lens aperture to nearly maximum. Quality production requires supplementary lighting in most indoor situations, and this can be provided by one or two hand-held quartz-halogen "sun guns" or by small photofloods. Whatever the light source, it should be behind or well above the camera position and located about 45 degrees to the camera axis. If there are windows in the room, they are a source of daylight illumination, and the camera must be aimed away from them.

5.) Sound quality is the third dimension of video and is directly related to microphone placement. This matter is frequently slighted, resulting in a relatively high background noise level. Microphones should be placed as close as possible to the actor(s) or hung around their necks, if possible. If the microphone can't be placed on the person or on a desk stand next to him/her, it should be aimed at the actor(s) by someone holding it at the nearest position off-camera. Other possibilities are hiding the microphone on the set, behind books, or in a newspaper or handbag next to the actor(s). If there is more than one sound source separated by more than ten feet or so, it will be necessary to use multiple microphones and a sound mixer, which combines the signals before they enter the recorder.

If the message is worth messaging, the video medium will then carry its own weight by virtue of its built-in property of projecting "electronic immediacy".

Other media, though they are less likely to project spurious messages, can be impeded by sources of "noise" which interfere with information transfer.

They generally have to possess much higher intrinsic quality than video in order to be effective. Audiotape is an example of a medium where the technology is far ahead of the available expert imagination to utilize it. The potential quality for voice recording inherent even in the popular cassette format is about as good in medium-priced home recording units as it is in the very best professional machines. Nevertheless, this potential realism and information content is seldom realized due to bad recording and playback conditions.

1.) As with video, the script and "packaging" must be appropriate in content, length, and format to the class for which it is intended.

2.) The recording location is the most important single factor, assuming the equipment is in basic working order. In audiotape recording of spoken "studio" material, excluding extraneous sound from the recording is extremely important. At the same time, it's necessary to record in sufficiently anechoic surroundings that the material doesn't sound like it is emerging from a storm sewer. Both factors can be controlled by recording in surroundings having some sort of sound insulation, however impromptu. A closet full of clothes makes a very good substitute for a sound-insulated recording booth. Recording under a blanket draped over a chair back is another good method for reducing sound and quality distractions. Neither method is particularly inconvenient and either will considerably improve the finished product over the usual tinny and noise-ridden recording made in office or classroom surroundings.

3.) The microphone placement consideration of video recording applies even more to audio, since its message is all in the audio dimension. The microphone is placed within eighteen inches of the speaker's mouth and is aimed precisely at it. This, of course, assumes that you will be using a fairly good, directional microphone. The built-in microphone in some cassette recorders is an emergency convenience device only and is not recommended for making educational materials. It has poor frequency response and picks up a significant level of motor noise from the recorder itself.

If a greater bass effect is desired (low-priced microphones have little or no bass response at normal sound levels), the microphone should be placed as close as six inches from the speaker's mouth and covered with acoustic foam, while the speaker is instructed to direct his/her voice more across the microphone than directly into it, to avoid excessively plosive "pops".

4.) Mixing is necessary, as with video recording, if more than one sound source is involved. A common situation is mixing an auxiliary source, such as recorded music, with live voice. Verite recordings can also be constructed in this way by using recorded effects. Preliminary run-throughs, are of course, needed to get the timing of the material in the correct mutual relationship and to adjust relative levels. That is, you don't want the music to begin or end at the wrong times, and you certainly don't want it to be louder than the voice track.

5.) Tape format is an important parameter in the quality equation and is related to the type and amount of editing which will be required. Open reel-to-reel format is still generally the best and most flexible format for recording

the original. The signal-to-noise ratio--the lack of "muddiness" in the sound--is much higher with moderate-priced open reel machines than it is with comparably priced cassette apparatus, as is the steadiness of the speeds. And mechanical editing, the old cut-and-splice technique, still results in the best quality original, since it doesn't involve the additional generation of re-recording, as in electronic editing.

On other hand, cassette have the clear advantages of storability and material accessibility, as well as being exceptionally convenient from the equipment operation standpoint. One compromise is to make all original tapes in open reel format, edit them in this format and re-record the edited material onto cassette copies for classroom use. The original reel is kept in storage in case the copies are lost or damaged and need to be replaced in circulation. If one intends to have a library of materials where a high rate of utilization is a prime aim, then such an approach is called for.

A lower quality approach, but one which has a higher convenience rating, is making original recordings on high quality chromium dioxide ( $\text{CrO}_2$ ) cassette tape, with an appropriate recorder setting, or with a Dolby noise-reduction system. Classroom copies could then be made from an easily storable cassette original with somewhat improved frequency response and noise figures over standard cassette-to-cassette duplication.

Any tape duplication process is accomplished by wiring the high impedance ("aux" or "radio/phono") outputs and inputs, respectively, of the two machines together. The speaker-to-microphone type of tape duplication does severe violence to the recorded sound and is not recommended for any application.

Much more could be said about general factors which affect quality of sound recordings. For instance, all the above assumes that the playback apparatus is adequate for the classroom and that it is in a good state of repair. Frequently, cassette recorders are designed for "personal" use only, and have speakers and amplifiers which are entirely too small for playback more than five feet away. These cannot cover an entire room. Equipment is often allowed to accumulate dirt on the playback head, the capstan, and in the input and output jacks, which seriously affects sound in a variety of ways. Finally, the room itself may not be well designed for class use of sound materials. The walls of some rooms are acoustically so "hard" that destructive echoes are set up. Needless to say, this equally bodes ill for the students' being able to hear the teacher's voice. Noise interference from outside the classroom also affects--and, in the case of schools near an airport, may obliterate--sound quality. In such cases, and where different groups are working in the same room, it may be necessary to resort to some variant of the language lab format: headphones connected to a central console or used with individual cassette machines in a "library" tape check-out system. In any event, the quality of the environment must certainly be as important a factor as it is in video, slides, or other media.

The photographic medium--prints, slides, and instant polaroid snapshots

--also seems to have inherent properties which evoke an interest response, regardless of the message content. Large size (16" x 20", or larger) mounted prints of locations, cultural activities, or individual interactions have proved useful for composition starters. The use of appropriately selected slide programs also almost inevitably increases the students interest and participation in the study of a given instructional unit. Student participation in the making of "snapshot stories" and write-on filmstrips has been carried out with great success in public schools. At UCLA, cross-cultural teaching points in ESL classes are frequently reinforced with slide presentations furnished by the students. Such materials in which students have participated possess enormous relating power and, therefore, must be considered high in quality, where appropriately used--even though they are "only snapshots".

But materials designed for a library resource of more general use unfortunately can't always take advantage of the relating power that personalized class materials have. Then as the case of video, in order for the visuals to achieve their intended teaching objectives, they must be able to stand on the basis of their own inherent quality. If quality in video and sound materials made by teachers is dependent on a variety of parameters, including the nature of the classroom, quality in photographic materials is even more of a delicate matter. When one is dealing with a medium with the detail, color, projected size, and visual impact of photographic transparencies, one has the choice of either overwhelming the students with trash, or of creating lesson materials which can present well, effectively and efficiently a great range of subject matter.

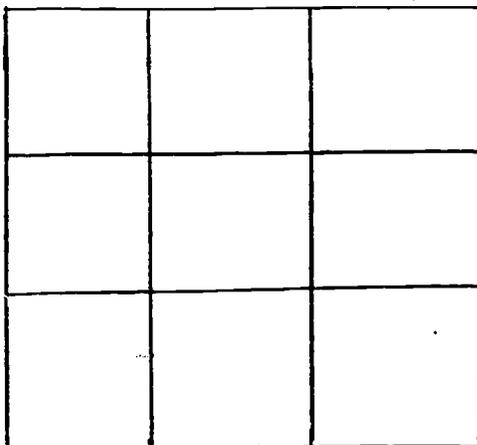
But there is a danger in the fact that taking a photograph is not in itself a painstaking process. You can easily project Uncle Fred and Aunt Martha to huge proportions, out of focus, and with the chimney in the background apparently sticking out of Aunt Martha's head. The image can have the size and general color range of the Sistine Chapel, but it took only five hundredth of a second to make. And every second, more pictures than Chagall or a Rembrandt produced in a lifetime are being created in this way. In painting, one has hours, days, and weeks to create quality in a picture. But, in photography, quality in the image demands looking at the subject and manipulating it carefully into a picture in the viewfinder before that five-hundredths of a second has been reached and passed. Even then, one can't be really certain what has just been recorded on the film. Learning to see how the picture is going to look and comparing that with how you want it to look are prime requisites to quality. Some of the conditions which must be met to achieve a slide presentation which possesses a high degree of relating power are:

- 1.) A carefully written script of appropriate length and carefully edited language content to which to fit the visuals. Though this is a given condition for any media presentation, slide scripts may require special types of scripting, depending on the type of lesson. Dialogue and narration lessons, where each picture denotes a step in the progressions of the action or in the development of the subject matter, require a script to key each slide to a given sentence or effect in the sound track.

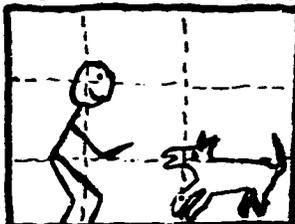
A collage lesson involves a much greater number of slides designed to depict the whole environment of a subject, such as pollution; Berkeley, California; the Sunset Strip milieu; or the Chicano subculture of East Los Angeles. At UCLA we have experimented with one such presentation, called "Old Friends" (by S. Ulm, N. Villoria, and D. Walker), which is concerned the problem of aging. The script consists of a guide to the use of the materials, the sound being the Simon and Garfunkle song, "Old Friends". Guidance for using the materials to generate discussion and composition on the cross-cultural point of the treatment of the aged is furnished, and other materials, a Time feature on senior citizens and a radio news feature (on the accompanying sound tape), are included in the multi-media package. The slides serve to create an information environment for the topic by showing old people in Santa Monica, while the lyrics of the song play in the background. Information about interpersonal relations, modes of dress, habitat entertainment, and attitudes are all included without other comment, in the visuals. Though this is not a non-conventional format, it is one which hitherto hasn't been applied significantly to second language materials.

2.) Simplicity in the picture composition and in the editing of the sequence of pictures is a principle for really controlling the message and strengthening it by eliminating distractions. In that five-hundredth of a second, it's rather easy to include a lot of material in a picture that doesn't belong to it, even though it's there in the real world. By the same token, it's easy to include a lot of slides in a given program that don't really add anything to the whole effort.

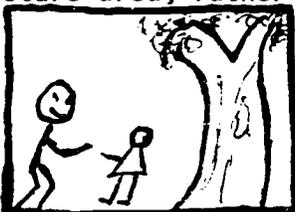
Simplicity in individual pictures is achieved mainly by accurate framing of the subject and by control or elimination of background detail. The act of framing entails getting close enough to the subject so that it fills the frame appropriately, and so that no other distracting detail is included. Lines and masses in the picture should also be balanced in a pleasing way. Mastering this aspect of composition might come naturally, or it might require several courses in photography. One rule of thumb which is worth remembering is the Thirds Rule, whereby the picture area is divided up like a tic-tac-toe game:



The main areas of interest should then fall near one or more of the intersections of the lines--not at the center or near the edges:



Similarly, people should be made to face slightly into (toward the center of) the picture and lines of trees, buildings, or the figures of people should tend to circulate within the picture area, rather than leading the eye out of it:



These rules were developed somewhere around the time of the Italian Renaissance and still apply to the best modern visual art. Since they make a picture say more, and do it with greater economy, they cannot be ignored in making good media lessons.

Editing should be ruthless in regard to simplicity, both from the basic standpoint of length and in keeping the subject matter clear and authentic. Length of language teaching slide presentations of the dialogue/narrative type is usually limited to 40-50 slides. to obtain the maximum attentiveness to the medium. Collage type slide programs tend to be longer, up to around 100 pictures, since there is usually greater variety and speed of presentation in the visual environment being created. Thus, one can photograph a lesson on less than two rolls of film, have plenty of room to eliminate pictures with incidental defects, and substitute duplicate shots.

The criterion of simplicity should not be used in such a way that the picture lose character. They must say visually what they mean linguistically, and, to do this, relevant characteristics of locations should be shown and facial expressions, gestures, and actions made full use of to reinforce the language. One of our best examples of striking a good compromise between simplicity and character is a lesson on the use of the conditional structure, "Lucy and Nancy in Hollywood", by Abby Sher. The two actors personify two different character types, a "positive" person and a "negative" person. Set against various Hollywood Blvd. locations, the characters try to decide what to do for entertainment, one trying to persuade the other and the other always coming up with an excuse: "We could play cards!" "But if we played cards, you would beat me." Facial expressions and body gestures are used in each picture to distinguish the attitudes of the two women. If these factors were not important, there would be no point in using pictures. A major cause of quality failure is the "anything" picture, where no character at all exists

to delineate meaning.

3.) It is also good professional practice to vary camera angles and distances from one shot to another so that the interest level of the program is maintained. Though this is a lower order criterion which should not allow the camera to get in the way of the message, a change of camera angle from the usual eyelevel position to a lower level may align the camera with a much more uncluttered background, e.g., the sky, behind the subject. By the same token, experimentation with moving the camera laterally can eliminate unwanted background. Another way of simplifying background will be discussed in the next section.

4.) Film type ties closely to the other important technical criteria of exposure and depth of field. For beginners, higher quality is likely to result from the use of a more light-sensitive material such as High Speed Ektachrome (a.s.a. 160), GAF 200 (a.s.a. 200) or Fujichrome (a.s.a. 100). Since each of these require relatively short exposures in daylight or bright interiors, they tend to be more forgiving of several types of errors. First of all, higher shutter speeds can be used, resulting in a lessened probability of camera or subject movement ruining the picture. Alternatively, higher film sensitivity (higher a.s.a. values) allows a smaller lens opening (f stop) to be used. This has the effect of increasing the distance through which lens is in focus. If, for example, the lens is set for 10 feet at f4, its "depth of field", for which images will be acceptable sharp, might be 9 feet to 11.5 feet. If the lens opening were decreased to, say, f11, and the shutter speed lowered to compensate, the depth of field would increase, so that the picture is now in focus from a distance of 6 feet to 17 feet.<sup>3</sup> Thus, focussing errors are less likely to create problems with a film with which small lens openings are the rule. Similar arguments apply to the use of a sensitive film for flash illumination.

A third quality advantage is that exposure latitude tends to be greater with more sensitive films. That is, the inherent contrast (difference between the rendering of light and dark areas) is less, and the allowable exposure error for acceptable results is increased.

But, as more experience is gained, it may be desirable to experiment with a less sensitive film, such as Kodachrome 64 or 25. It is often valuable, for simplification, to be able to limit depth of field, as well as to extend it. For example, if distracting background detail or textures cannot be eliminated from the picture by altering the camera angle, decreasing the depth of field will at least cause the background to go selectively out of focus, while the subject area remains sharp. This strategy is most useful for a subject area consisting of people and objects fairly near (up to 15 feet) the camera. If a less sensitive film is used, the lens opening can be made wider than is often possible to accomplish the same reduction of depth of field to "fuzz out" the background by increasing the lens opening and compensating with a higher shutter speed.

Another quality advantage of "slower" film is its property of reducing the picture's "grain" characteristics. Any photographic film depends on fine particles of silver halide to act as the light-sensitive agent. Since these

particles are of finite size, they limit the image-resolving power of the film, and can be seen in the developed image as tiny dots or lumps. In a fine grain film, usually of lower sensitivity, these dots are smaller, and consequently the reproduction of detail is more impressive. While the grain characteristics of modern high sensitivity films are quite adequate for projection, less sensitive and finer grain films lend themselves better to low contrast types of conditions, where grain becomes very apparent, or to making slides under controlled lighting conditions which are intended for duplication.

5.) Lighting is another parameter which must be dealt with in understanding photographic quality. While most fast films are also very forgiving, one still needs to develop an awareness of what the film will see, rather than what appears to the idealizing eye. Fluorescent lighting appears white to most people's eyes. It appears bluish-green to High Speed Ektachrome and a slightly darker green to Kodachrome 64. "Objective" reality isn't always seen the same by different films, but normal incandescent lighting is yellow and is so rendered by any color film. Outdoor light in open shade comes mainly from the sky and is therefore blue. Light reflecting from grass or buildings tends to take on the color of the reflecting medium. Whether or not the light color is compatible with the intended result needs to be kept in mind when setting up the picture. In any event, lighting errors shouldn't be allowed to contribute to the "noise" of the picture.

Without going into the details of good photographic lighting, a good rule to follow is that, given the correct exposure, diffused lighting tends to produce better results than harsh, direct lighting. In Los Angeles, the smog and natural haze tends to help us in this respect, so that lighting which produces too great contrast is seldom a problem except at the beach. Cloudy days generally provide good shooting conditions. Otherwise, white cardboard reflectors should be used to balance strong sunlight and to "open up" shadows on people's faces. If a neutral-colored building wall is at hand, it can be used as a natural reflector.

The proper aim, then, of any media work is to create a product which will communicate the intended message with the greatest amount of clarity and the least non-communicative noise, using the inherent impact of an appropriate medium. This is how we work out the quality of relating power.

These are only a few major factors which I, as one humanist, have found to be crucial to quality in this cross section of media. There are others. Indeed there are other media which have not been fully explored yet which may have more relating power to contribute than any so far considered. Possibilities seem to lie in the areas of computer-assisted language instruction of the flexible PLATO type, individualized use of the cassette videotape format, and holography.

We have only discussed the whole-class application of media. It may be that real quality can't be achieved in such an environment due to the variety of students needs and responses to teaching media. Classes tend to be heterogeneous in skill levels, and the winds of change seem to be indicating that some form of individualized--though not necessarily programmed--instruction