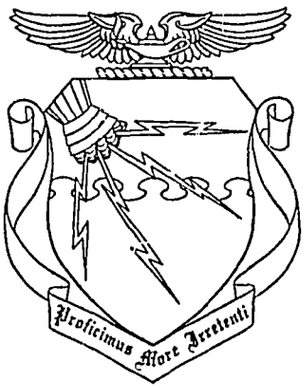
The Television Instructor

AU-9



Air University

Maxwell Air Force Base, Alabama

The Television Instructor

AU–9

Prepared by

Television Teaching Laboratory

Academic Instructor and Allied Officer School

and

Air University Television Center

3825th Support Group (Academic)

Air University
Maxwell Air Force Base, Alabama

November 1965

The material in this manual is directed to the Air Force instructor who will work in a facility where a television staff is available to assist him in preparing and presenting televised instruction. We recognize the existence, value and operational suitability of facilities where single console, instructor controlled telecasts are presented. The great majority of TV facilities in the Armed Forces embrace the instructor-production team concept. Consequently, the facets of instructor produced telecasts, which are essentially modifications of concept and techniques described herein, are not given separate treatment.

This publication has been reviewed and approved by competent personnel of the preparing command in accordance with current directives on doctrine, policy, essentiality, propriety, and quality.

Contents

Chapter		Page
1	WHY TELEVISION?	1
	Advantages	1
	Distribution	1
	Attention	1
	Selection	2
	Amplification	2
	Presence	3
	Flexibility	3
	Standardization	3
	Limitations	3
	Lack of feedback	3
	Restricted movement	4
	Preparation requirements	4
2	TELEVISION AND THE LEARNING PROCESS	5
	The Laws of Learning	5
	The law of participation (response)	5
	The law of effect (reward)	5
	The law of frequency (repetition)	6
	The law of readiness (motivation)	6
	The law of intensity (vividness)	6
	The law of primacy (first impression)	6
	The law of recency (last impressions)	7
	The law of individual differences	7
	Television and the Laws of Learning	7
	Summary	8
3	LESSON PLANNING	9
	Lesson Objective and Learning Outcomes	9
	Selecting a Method	9
	Lecture	10
	Demonstration-Performance	10
	Discussion Method	10
	Interview	11
	Panel	11
	The Use of Problems	11
	Conducting Research	11
	Organizing the Lesson	13
	The Lesson Plan	13
4	BASIC TELEVISION FOR THE INSTRUCTOR	14
	The Production Crew	14
	The program director	14
	The technical director	14
	The audio engineer	15
	The video engineer	15
	The cameraman	15
	The floor director	15

Chapter *Page*

Camera Movements 15
Uses of camera movement 15
Explanation of camera movements 15
Camera Shots and Lenses 15
Camera shots 15
Lenses 17
Switching 17
Selecting the picture 17
Switching effects 17
Lighting 18
Audio 20
Microphones 20
Recordings 20
Sound on film 20
Audio mixing 20
Films and Slides 21
Film projection 21
Slide projection 21
The multiplexer 21

5 PREPARING THE TELECAST 22

Program Assistance 22
The television coordinator 22
The program director 22
The graphic artist 22
The technical writer 22
Program Conferences 23
The initial script conference 23
The visual aids conference 23
The final script conference 23
Preparing the Script 23
The verbatim script 23
The outline script 25
The opening 25
The closing 25
Slides 25
Films 25
Recordings 25
Rehearsals 25
The dry run 25
The walk through 28
The camera rehearsal 28

6 INSTRUCTIONAL AIDS FOR TELEVISION 29

Choosing the Right Aid 29
Visual aids for TV 29
Motivational aids 29
Explanatory aids 29
Aids for variety 30

Chapter Page

Displaying Aids on Television 30
The film camera chain 30
Rear projection 30
Camera cards 31
Continuity devices 31
Suspense devices 31
Models and mockups 31
Audio devices 31
Principles of TV Aids 32
Aspect ratio 32
Edge loss and safety field 32
Lettering 33
Size 33
The gray scale 33

7 Making Your Own Visual Aids 35

Quick Lettering 35
Freehand 35
Lettering devices 35
Preparing Slides 36
Types of slides 36
Still Pictures 39
Mounted stills 39
Use of the opaque projector 39
Tabs 39
Magnetic on metal 39
Sandpaper on felt 39
Hook tabs on pegboard 39

8 The Instructor on Camera 40

Camera Presence 40
Delivery 40
Personal appearance 41
Working With Visual Aids 42
Use of Microphones 42
The microphone check 42
The lavalier 43
The table microphone 43
The boom microphone 43
Cues and Signals 43
Hand signals 43
The tally lights 44
The studio monitor 45
Cues from the instructor 46
Prompting Devices 46
The roll up prompter 46
Cue cards 47
Notes 47
Quotation cards 48

Chapter *Page*

9 TELEVISION AND THE CLASSROOM TEACHER 49
Team Teaching 49
Relationship of TV-classroom instructor team 49
Before the telecast 49
During the telecast 51
After the telecast 52
Television as an Instructional Aid 52
Television as an Instructional Device 52

10 EVALUATION WITH TELEVISION 54
Testing Student Achievement 54
Specific objectives 54
Better tests 54
Continuous evaluation 55
Use of Television as a Testing Medium 55
Dramatized situations 55
Instructor observation 55
Limitations of TV testing 56
Evaluating Teacher Performance 57
Self-Critiquing with Video Tape 57
References for Further Reading 59

CHAPTER 1

Why Television?

TELEVISION, like all other new developments in the fields of education and training, requires those who use it to alter somewhat their ways of thinking, acting, and planning. It is necessary that the instructor realize that TV does not, of itself, produce or teach a lesson; it does not make a lesson good or bad, nor does it automatically make a lesson more interesting or challenging.

The effectiveness of the television medium in teaching depends upon how intelligently and imaginatively it is used. Like any other medium of instruction it has both advantages and limitations. To enhance the effectiveness of his presentation the instructor must capitalize on the advantages offered while at the same time recognize and minimize the limitations. With this in mind, let's examine some of the general advantages of the television medium.

1. Advantages

Distribution.—In order to stay abreast of a changing and advancing world and meet the increasing demand for more and better professional training in the Air Force, personnel have to spend an increasing amount of time in schools. Therefore, the real problem is how to reach the greatest number of people with a reasonable expenditure of manpower and facilities. Television helps solve the problem by sharply increasing the student to faculty ratio. In short, television can help us solve the problem of more instruction for more people.

While resolving the need for quantity, quality of instruction need not be sacrificed. In fact, quality can actually be improved in many ways.

Attention.—A television screen seems to act as a magnet for attention. It is difficult to avoid looking at a television set which is turned on in the room. The student in the classroom may be expected to react similarly, so it has a "built-in" advantage not possessed by any other method.

While studies have shown that students can learn as readily from a simple television presentation as from an elaborate production, it is obvious that attention must not only be gained but also maintained throughout the lesson. The ease and effectiveness by which the medium of television can be used to hold the viewer's attention provide the instructor with a distinct advantage. He can achieve attention with a minimum of personal activity. Such basic capabilities as audio

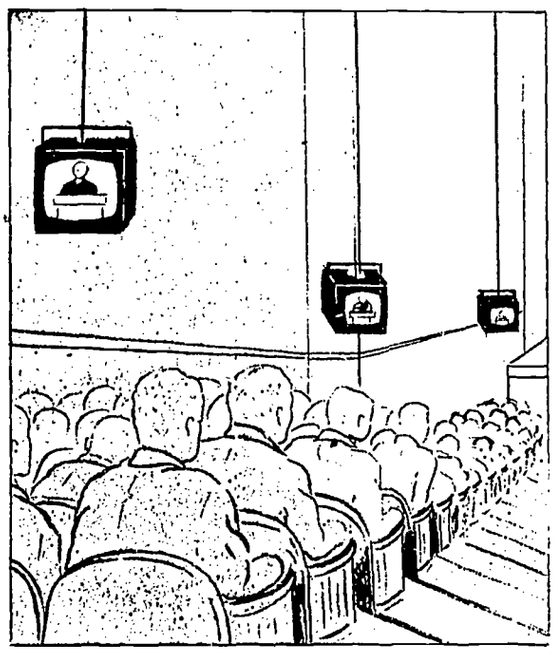


Figure 1. Multiple monitors provide a greater number of students with a better view of the teaching performance.

and visual effects, superimposures and variety of viewing angles lend interest to the telecast and aid in maintaining the student's attention.

Selection.—By means of selective television techniques, the student's attention can be focused on specific material with no distractions. For example, if the subject matter is an electrical wiring diagram, the camera may show only that part of the diagram being described. Another example is the panel discussion—the camera can select the member who is talking and concentrate on him, thereby insuring that attention will not wander to other participants, objects or activities. Thus TV directs attention to the proper place while at the same time it eliminates normal distractions. This is an advantage long associated with the use of film in teaching. When this advantage is coupled with the natural attraction of the television screen and when the viewing room is devoid of major distractions, the ability of the student to concentrate on the desired material is enhanced.

Amplification.—Television can magnify small objects in such a manner that they may be seen by a large number of people at the same time. This characteristic is especially valuable in medical and dental schools. Whereas in the past, only a few medical or dental students could observe an operation or extraction, now an almost unlimited number may witness the event. This capability can be applied to instruction in many areas, but is especially useful in the magnification of minute technical equipment and delicate demonstrations.

In many instances, television reduces the requirements for the production of instructional aids. A postage stamp can be seen on a television screen with almost as much clarity as if it were seen under a magnifying glass. A small map, diagram or photograph from a book or magazine need not be expensively reproduced in order for it to be seen by a large class. The camera is capable of transmitting the material directly from the printed page. It is also possible to use original pieces of small equipment for illustration

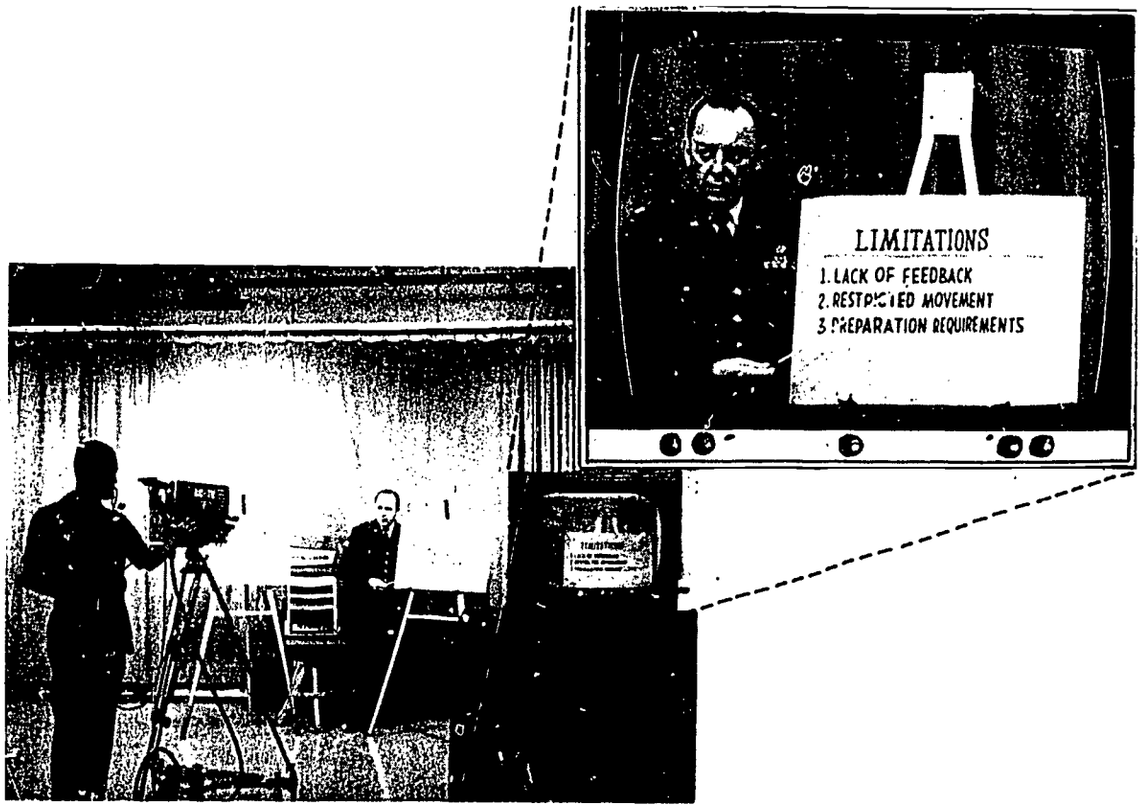


Figure 2. Television permits the student to view only the material which the instructor wishes him to see.

in lieu of large and costly mock-ups. Hence, small training aids, such as aircraft models, which could not be properly used in large classrooms are well suited to television use.

Presence.—Television provides the immediacy of the classroom and the intimacy of film. The "you-are-there" feeling lends interest and authenticity to the lesson. At the same time the instructor can establish a personal, conversational relationship with each student. The "eye contact" of television gives each student the feeling that the instructor is talking directly to him. An instructor's sincerity and enthusiasm can become contagious and result in increased student motivation.

Many lessons which were once restricted to small intimate groups can now, through the advantage of television presence, be taught to large gr ips without a loss of instructor personality.

Flexibility.—Television can lend unusual flexibility and versatility to the instructor. In the average classrooms the use of conventional training aids gives rise to many problems. For example, if the teacher plans to use a film, he has to arrange for the projection equipment, transport it to the classroom, set it up, adjust the screen and lights. Furthermore, projector noise can be a problem, and a darkened room makes it difficult for the students to take notes. Television minimizes these frustrations.

The student's view can be switched from one live scene to another or to a film sequence. He can be transported from one educational situation to another without leaving his seat. Slides, charts and remote demonstrations can be integrated into a lesson with ease. Several methods of teaching, such as lecture, panel and symposium, can be used in a single presentation without creating a distraction. Kinescope and video tape capabilities add to television's flexibility. Recorded telecasts are not dependent upon availability of instructors at specific times, thus the problem of scheduling is simplified.

Standardization.—Standardization, a long standing goal of military training, particularly in technical fields, is being achieved through the use of television. The use of prepared scripts and prompting devices has tended to standardize live telecasts when repeated to succeeding classes. The use of kinescope and video-tape recordings also has tended to standardize lesson content and instructor delivery of a single lesson to many classes. Through this standardization, classes can be evaluated with greater validity than ever before.

The advantages discussed above do not pretend to be an exhaustive listing. The instructor will discover others as he becomes more familiar with the medium.

2. Limitations

There are certain limitations inherent in television. Good lesson planning carries with it an obligation to cope with limitations; therefore, they should be recognized so that their influence may be minimized.

Lack of feedback.—This is probably the most universally recognized limitation of educational television. Teachers have come to expect questions and comments from their students as a means of judging the effectiveness of their presentation. With the precise timing of television lessons and the extensive use of recorded periods of instruction, the historical system of question periods has not worked for television. Even the elaborate and expensive "talk-back" systems which were installed for television classes have not proved effective in judging how well the students have learned the material or how well the instructor has taught it. As in conventional classrooms, there are those students who raise questions for personal recognition by the teacher or the class and there are those who are reluctant to ask for clarification when they are confused or unsure of the material. Furthermore, the questions asked are often poorly worded and the answers given equally vague. Remedial techniques are available to the teacher on television such as careful lesson planning to identify difficult areas of his lesson; the team teaching system (see Chapter 9, "Television and the Classroom Teacher") where a classroom teacher can answer questions; periodic testing and review; and even the submission of written and therefore better stated questions for direct answer or later discussion on television for benefit of the whole class.

Another limitation of television feedback which concerns many instructors is the inability to judge audience reaction during the lesson. Training and experience on the part of the instructor to speak conversationally and confidently to an unseen audience helps to solve this problem. It is also

appropriate to put a sample student group in the studio for the benefit of the instructor where this type of feedback is essential. This would provide an audience reaction, teacher motivation, and feedback from at least a sampling of students.

Restricted movement.—The span of view of the television camera for the most commonly used shots (medium and close-up) is considerably smaller than that of the human eye. Movement, therefore, within this restricted field is greatly exaggerated. The instructor may distract or lose his viewer unless he trains himself to slow, deliberate movements. He must confine his work and body movements to the camera viewing area. He must maintain a consciousness of this limitation throughout his presentation. This problem can, to a large extent, be overcome by rehearsal prior to the telecast.

Preparation requirements.—Many teachers, when first confronted with this new medium, are reluctant to incorporate new techniques which distinguish television from conventional instruction. This attitude is difficult to overcome and necessitates an in-service training program to reorient teacher techniques for the medium. Perhaps the most startling drawback is the additional preparation time required for even the most experienced teacher. Objectives must be clearly identified and the lesson organized to meet those objectives. In planning for the television lesson every effort must be made to take advantage of the capabilities and minimize the limitations of the television medium, for herein lies the key to the effective use of television for teaching. While the amount of preparation varies with teachers and subject material, it still takes hours of preparation and rehearsal to put on an effective telecast. It is now customary in a great number of educational institutions to divorce the television teacher from all classroom responsibilities so that he may concentrate on his research and preparation of the televised lesson.

Review Questions

1. Aside from saving in teachers, how does the ability of televised instruction to reach more students help instruction in Air Force technical schools?
2. What are some of the ways that attention may be gained and maintained in a television lesson?
3. How would the selectivity of the television lesson be used in a panel discussion?
4. Identify two ways in which the ability of television to magnify small objects is useful.
5. How does the use of television differ from the use of training films in the classroom?
6. How might the lack of feedback be overcome if no classroom teacher is used? From the standpoint of the student? From the standpoint of the instructor?

CHAPTER 2

Television and the Learning Process

EVERY TEACHER, whether teaching via the medium of television or in the regular classroom situation, should understand the learning process. He needs to know what happens when the student learns and what he can do to accentuate, intensify, and make more positive the teaching-learning process. It is this student-centered concept of learning with which this chapter is concerned.

One of man's unique characteristics is that he is a learner. He learns from the time he is born until he dies. Sometimes—when the individual daydreams, performs tasks that he can do automatically, or sleeps—the learning process almost ceases. At other times—in the classroom, the laboratory, the library, or the television workshop—the learning process is focused or intensified. Thus, by understanding the process of learning as it takes place in the mind of the student, the teacher can do more to increase his students' effectiveness in the classroom.

To be able to vitalize the learning process, the teacher must first know what learning is. Learning has been defined in many ways, but all definitions and schools of thought have one idea in common: learning is an active process. It is not a passive process in which the student automatically absorbs knowledge. The learner may expand his knowledge, alter his response to a certain stimulus, acquire a skill, gain a new insight, or change his behavior in some other way. These are all the result of an active student process of learning. Whatever he learns, he undergoes a change when he learns it. Learning is an active process and results in changed behavior. Because of this change, the student responds to a stimulus in a different way.

Not only must the teacher understand the changes that make up learning, but he must be able to define, observe, measure, and evaluate these changes. More importantly, he must be able to bring them about. To induce a desired change in the students, to help them, the instructor needs to understand what constitutes a good learning environment, why some students learn more than others, what makes some lessons effective while others are not, and why one technique fails where others succeed. Indeed, he needs to know what learning is and how to help bring it about in the student.

3. The Laws of Learning

Some authorities call the laws of learning "principles"; others say they are neither laws nor principles, but "learning factors." Still others call them "rules." But these words are only labels and consequently are not of primary concern here. A survey of textbooks on learning will not bring to light a fixed and final set of laws, principles, or rules. Learning is a subjective thing, and to treat it completely and with depth would be to delve into psychology, biology, physiology, and almost every science having to do with man. Obviously, that approach is impossible and impractical in this textbook. For that reason, although the following laws of learning are sound, the list is necessarily arbitrary and incomplete.

The law of participation (response).—Students learn best when they are active. Participation in a lesson is action. This type of action is a factor that profoundly influences learning. Because the competent teacher realizes that idleness, either mental or physical, can be detrimental to learning, he plans a variety of activities for his students.

Activity can take many forms: thinking, listening, observing, recalling, reasoning, generalizing, discriminating, imagining, writing, discussing, answering, questioning, believing, disagreeing, feeling, touching, moving, doing, and speaking. All of these can help the student learn.

The law of effect (reward).—This law is based on the emotional reaction of the learner. It states that learning is strengthened when accompanied by a pleasant or satisfying feeling and that learning is weakened when associated with an unpleasant feeling. An experience that produces feelings of defeat, frustration, anger, confusion, or futility in the student is unpleasant for him. If an instructor pilot attempts to teach aerobatic maneuvers to an aviation cadet on his first flight, the student is likely to feel inferior and to be dissatisfied. As a demonstration that shows the student his goal, the aerobatics might motivate the student, but as something to be learned immediately, the aerobatics would be frustrating. In terms of the learning objective, this experience would be unpleasant.

Teachers should be cautious about using negative motivation in the classroom. Impressing students with the seeming impossibility of a problem can make the teaching task difficult. Usually it is better to show a student that a problem is not impossible at all but is within his capability to understand and solve. Whatever the learning situation, it should contain elements that affect the student positively and give him a feeling of satisfaction. Every learning experience does not have to be entirely successful, nor does the student have to master each lesson completely. But a student's chance of success will be increased if the learning experience is pleasant.

The law of frequency (repetition).—This law states that those things most often repeated are best remembered. It is the basis of practice and drill. The human memory is not infallible. The mind can rarely retain, evaluate, and apply new concepts or practices after a single exposure. A student does not learn touch typing at one sitting. He learns by applying what he has been told, and every time he practices, his learning continues. The teacher must provide opportunities for students to practice or repeat, and the student must see that this process is directed toward a goal. Repetition can be of many types, including recall, review, restatement, manual drill, and physical application.

The law of readiness (motivation).—The factor that has perhaps the greatest influence on learning is motivation, the force that causes a person to move toward a goal. This force is dormant in some people and active in others, but it is always present in some degree. It can be rooted in any or all of the personal-social needs of the student, for example, the need for security, for new experience, for recognition, for self-esteem, for conformity, or the need to help others. Such needs compel people to act, to move, to start working toward an objective, or to achieve a purpose. The teacher's responsibility is first to recognize and identify these needs and then to seek ways of satisfying them through his teaching.

To be successful, the student must feel a need to know, to understand, to believe, to act, or to acquire a skill. The wise teacher realizes that these needs are not separate and distinct from the personal-social needs of the student. In fact, the most effective motivation trades heavily on this awareness. The teacher must make students want to learn and, in some cases, must remove obstacles that students have placed in the paths of their own learning. The student must have a reason for learning, and if he cannot find it for himself, the teacher must find it for him. The Air Force teacher must establish himself as a "partner in learning" with the student. Students should be plainly told why it is important that they learn the lesson and how it will be of benefit to them and the Air Force.

A need to learn presupposes goals or objectives. If the motivation is of the right kind, the student will know what these goals are and how he can reach them. In the learning situation, the teacher usually establishes the objective for students, making sure that it is clear and specific. Without an objective, neither the student nor the teacher can measure progress or evaluate achievements.

The law of intensity (vividness).—A vivid, dramatic, or exciting learning experience teaches more than a routine or boring experience. A student of literature is likely to gain greater understanding and appreciation of the play *Macbeth* from seeing it performed than from merely reading it. He can learn more about fire fighting from watching someone fight a fire than from listening to a lecture on the subject. The law of intensity,

then, implies that a student will learn more from the real thing than from a substitute. Since the classroom imposes limitations on the amount of realism that can be brought into teaching, the teacher should use imagination in approaching reality as closely as possible. Mock-ups, colored slides, movies, filmstrips, charts, posters, photographs, and other audio-visual aids can add vividness to classroom instruction. Demonstrations, skits, and panels do much to stimulate the learning experiences of students. Televising a lesson may make it more interesting to the receiving students.

The law of primacy (first impression).—Primacy, the state of being first, often creates a strong, almost unshakable impression. For the teacher, this means that what he teaches must be right the first time. Unteaching is more difficult than teaching. If a new piano pupil learns incorrect finger positions, his teacher will have a difficult task in unteaching the bad habits and reteaching good ones. Every student should be started right. His first experience should be positive and functional so that it can prepare him, lay the foundation, for all that is to follow.

The law of recency (last impressions).—Other things being equal, the last things learned are best remembered. Conversely, the farther a student is removed time-wise from a new fact or understanding, the more difficulty he has in remembering it. It is sometimes easy, for example, to recall a telephone number dialed a few minutes previously, but it is usually impossible to recall an unfamiliar number dialed a week earlier. The teacher recognizes the law of recency when he carefully plans a summary for a lesson or an effective conclusion for a lecture. He repeats, restates, or reemphasizes important matters at the end of a lesson to make sure that the student remembers them instead of inconsequential details. The law of recency can often be applied advantageously in determining the relative positions of lectures within a course of instruction, and it is followed in scheduling briefings immediately before missions.

The law of individual differences.—A new teacher is likely to be discouraged when he discovers that a well-planned lesson does not teach all of his students with equal effectiveness. Usually, however, he soon sees that this is a natural and predictable state of affairs. One manifestation of the difference between students is that they seldom learn at the same rate. Differences in rates of learning are based on differences in native intelligence; background; experience; interests; desire to learn; and countless psychological, emotional, and physical factors. That students are different is a hard fact of life that teachers must cope with and recognize as the factor which largely dictates how much can be taught at what rate and when.

Since students do not learn at the same rate, it follows that the levels of student understanding will not be the same at any given moment. In other words, all students will not learn the same thing to identical degrees. The teacher must detect the differences; that is, he must determine individual levels of understanding. Otherwise, he cannot know how well he has taught, whether or not his job is finished, and what, if anything, he should do next.

The teacher has several gauges with which he can measure a student's understanding or mastery of a lesson. Student discussions afterwards are helpful and generally reliable. A study of students' test and achievement scores sometimes provides objective assessments. Personal conferences, contacts in the classroom, written assignments, and informal talks can also indicate a student's status and progress.

4. Television and the Laws of Learning

A televised lesson, like any other lesson, must be prepared with the student in mind. By carefully planning to maximize the advantages of the medium and minimizing its limitations, learning can be enhanced and intensified in accordance with the laws described above.

In our discussion of the laws of learning, we stated, first, that learning is an active process which requires student participation. The properly staged television lesson may stimulate student activity to a degree not possible in the large classroom or lecture hall. The flexibility of the medium and the employment of effective production techniques can facilitate listening and observing, can make the student feel that he is actively engaged in a discussion with the instructor, and can thus reinforce learning throughout the lesson.

The laws of effect and readiness deal primarily with the student's emotional reactions to the learning situation. Viewing television is usually

thought to be a pleasant pastime, whereas classroom instruction may be regarded as anything but pleasant. The student accepts televised instruction because he wants to watch television. Consequently, the task of gaining student attention is reduced in the televised lesson simply because a pleasant experience is anticipated. Production techniques can intensify the pleasantness of the experience. Close-up shots of detailed procedure, a wide variety of visual illustrations of abstract ideas, and thoroughly planned and rehearsed lesson content can all combine to greatly reduce the confusion and frustration that is frequently encountered in the classroom.

Motivation is facilitated in the television lesson. The selection of varied and realistic material will better enable the student to visualize the type of action that can or should be taken to achieve his goal. Variety in the selection of audio and visual stimuli enables the television instructor to appeal to the needs of a wide range of students.

Television can make repetition, dictated by the law of frequency, pleasant and productive. A concept can be illustrated in many ways and in many locations and situations. Probably most important is the fact that these varied illustrations can be readily visualized because of the flexibility of the medium.

The ability of television to provide a vivid and dramatic learning experience, as described in the law of intensity, is limited only by the imagination of the instructor. The wide range of visual aids that can be used during a television lesson would clutter a classroom to the extent that there might not be room for students. Visual aids coupled with the use of mood music, close-up shots, special effects, and zoom techniques can regenerate interest, relieve monotony, change pace, and provide a vivid realistic experience.

We have often heard the phrase "first impressions are lasting impressions," which is simply another way of stating the law of primacy. It would be a waste of time for the instructor to spend much effort unteaching. Consequently, we can use television to insure that errors in teaching are eliminated. Television lessons are carefully planned. The best informed instructors can be used to present the lesson to a large number of students. The lesson can be video taped to present the material in the identical manner each time it is given, and can thereby lay a firm and correct foundation for what is to follow. Since the televised lesson can be made pleasant, a pleasant first impression will probably increase the retention of the material by the student.

We have found that we can advantageously apply the law of recency when we determine the sequence of lessons within a course. A video taped lesson can be scheduled and offered at the most propitious time, for we need not face the problems of instructor availability, the availability of facilities which we do not control, nor the availability of transportation. Consequently, material can be presented as we think best for student retention.

We might think that televised lessons cannot cater to or meet individual differences. This need not be so. The flexibility of the medium enables us to use a wide range of techniques whereby we can provide variety in the visualization of concepts. This enables us to accommodate many backgrounds, intelligence levels, and interest levels. Taped lessons can be replayed for the benefit of the slow learner and thus free the instructor to devote more individual attention to the rest of the class.

5. Summary

Learning is an active process that produces changes in the students. The teacher must understand these changes. To achieve this goal, he needs to understand the laws of learning and to adapt his teaching to the individual differences of his students. Television as a teaching medium can help the learning process by intensifying the effect of some of these laws or factors. The television teacher should capitalize on the strengths of the medium and compensate for its inherent weaknesses.

A knowledge of the laws of learning helps the teacher to understand and take advantage of these factors that affect learning: participation, effect, frequency, readiness, intensity, primacy, recency, and individual differences. Students must have a need to know, to understand, to believe, to act, or to acquire a skill. All of these needs, which make up motivation, are inseparable from the personal-social needs of the students. Students learn best when they are active, when they participate. When purposeful activity is associated with learning, it makes the learning more permanent. Because of differences in experience,

background, intelligence, interests, desire to learn, and psychological, emotional, and physical factors, students learn at different rates. The teacher must recognize these individual differences and gear his teaching to reach all students, whatever their capabilities and abilities.

Television can enhance learning when used in accordance with the laws of learning. It can stimulate student participation and motivation. It can be used to advantage to provide lasting impressions, to increase learning, and to accommodate individual differences. It can intensify the emotional reactions of the learner and can intensify the learning experience. But perhaps the most valuable aspect of a televised lesson is its ability to provide variety, relieve monotony, and thereby make the learning experience vivid and exciting.

Review Questions

1. Define learning.
2. Why must a television teacher understand the learning process?
3. How can the television teacher adjust his instruction to the individual differences of his students?
4. Why is motivation so important to the learning process?
5. How does participation affect a student's learning?
6. How may television enhance learning?

CHAPTER 3

Lesson Planning

LESSON planning for television instruction differs little from conventional lesson planning. The necessity for it and some of the activities involved are identical. In all cases, the essence of lesson planning is the careful selection of instructor-student activities which are compatible with individual abilities and interests. The functions common to both television and the classroom are establishing the lesson objective and desired learning outcomes, conducting research and organizing the material. TV lesson planning differs in the emphasis placed on teamwork. The results are certain planning factors unique to the television medium.

6. Lesson Objective and Learning Outcomes

The lesson objective should be a clear, concise statement of what the student is to learn from the lesson. Care must be taken to insure that the subject is manageable for the time allotted. It must be limited to fit the class period. It is also imperative that the objective be stated so that activity is focused on the student. In brief, the objective as stated should indicate that the student is to learn something, not that the instructor is to teach something.

After the objective is established, the learning outcomes should be identified. These are the student accomplishments which directly contribute to the achievement of the lesson objective. The sum total of the desired learning outcomes should equal the lesson objective. They should not be vague generalizations, but should identify the specific learning to be acquired. Clear, direct statements of the lesson objective and desired learning outcomes will lend direction to the research.

7. Selecting a Method

After the teacher has planned the objectives to be accomplished by the lesson, he must decide how to attain the right student outcomes. This should be based on an understanding of how learning is acquired: by doing, discussing, listening, observing, and participating. Then he selects the most effective method to insure that learning takes place. In other words, the outcomes desired will dictate the method by which the best experience can be provided for the student. The teacher's job, then, is to provide activity that will result in meaningful experience.

The teacher cannot always provide the activity that he feels is best for a particular outcome. Class sizes, facilities, environment, time available, school policy, nature or character of the class, his own personality—any one of these factors may limit his ability to cause students to engage in the type of activity that he feels would result in the best student experience. Consequently, the teacher, using the desired student outcome as the most important criterion, frequently is forced to select his method of instruction by making the best compromise between what he believes he should do and what he knows he can do.

Method can be defined as a way of reaching a desired learning outcome by a series of acts. Method implies a planned sequence of procedures. It is the use of any device, technique or procedure to help the student learn. Put another way, an instructional method is a combination of techniques used by a teacher to cause student activity which in turn results in meaningful experience.

Many educational psychologists feel that students learn best when specific methods are used to get a particular type of student response or activity. Method selection should be based on the desired learning outcomes or level of learning

desired. It should be borne in mind that for the "viewing" students the experiences can be largely vicarious. Any extension of the classroom therefore which allows direct participation by the student will contribute to the effectiveness of the learning. The teaching method selected then should employ to a maximum degree the best techniques for involving the students directly in the learning activity. Such activity will often be influenced by technical capability and limitations of the television staff.

8. Lecture

No attempt will be made here to discuss the advantages or limitations of the lecture method *per se* but only as it may be adapted to use in the medium of television. Early television practice was largely limited to the use of the lecture. An instructor presented his regular classroom material by standing in front of a camera and talking to the audience. The basic sense of sight was not always stimulated, though a few charts or training aids were used. The lecture presented in the classroom may be offered on television with distinct advantages in two areas: teaching effectiveness and scheduling.

Teaching effectiveness does not necessarily increase merely by use of television. When used only as a communication medium it can exaggerate, rather than improve, ineffective teaching. On the other hand, television uses certain techniques which can enhance a lecture. The close-up and long shot for variety, various types of "superimposures," split screen techniques and animated illustrations are but a few. The ability to portray different types of information simultaneously gives the teacher an opportunity to make comparisons and to provide well illustrated examples. It is possible to present "right" and "wrong" examples, or to relate nomenclature to parts.

Scheduling is comparatively simple when the lecture is used. For example, one instructor can teach as many students as the number of receivers will permit. Thus, a maximum number of students can be reached with great ease by a single instructor. Lectures can be viewed in one large auditorium on receivers along the wall, or they may be televised to a number of rooms. The lecture may be supplemented by a recitation or laboratory under the guidance of classroom instructors.

9. Demonstration-Peformance

This method involves direct participation by the student and is best suited for teaching a specific skill, such as jet engine repair. The improvement that television makes to the normal classroom demonstration is in extending the number of people who may view a demonstration at close range, and in magnifying a function, involving small movable parts. Thus, an instrument repairman could demonstrate how to repair a bombsight before hundreds of students at work benches who could not otherwise crowd around the instructor for a good view. Conversely, large items of equipment that cannot be brought into the classroom can be effectively taught through televised lessons, thereby eliminating the need for field trips in many cases.

10. Discussion Method

A good solo performance by the teacher should not overshadow the value of class discussions to achieve the same goals. Discussion should do more than muster facts; it should develop ideas in order to achieve a "working" knowledge, or understanding, of the relationship of these ideas.

Television discussion benefits the teacher, and the students. It is a stimulus to the instructor when there are students present in the studio, for they give him a gauge by which he can measure his efforts. If the students in the studio are a part of the discussion the rest of the class is motivated to see how their contemporaries make out. This has an added bonus of holding the attention of the class. If the period of instruction is unrehearsed, many stimulating and thought provoking questions may develop. As in the lecture method, scheduling problems are simplified when the discussion method is used.

The televised discussion could operate in this manner: One group of students will be in the studio with the TV instructor while the other students will be in classrooms under the supervision of classroom instructors. The members of the studio group and the studio instructor will be "on camera" and telecast to the other classrooms. The groups in the classrooms can see and hear what is going on, although they cannot communicate with the studio group. While the responsibility for the discussion normally will belong to the studio group, the classroom instructor may call upon students in his group and may allow them

to ask questions and make comments. Thus, where it is desired that the classroom student participate in the discussion, close coordination must be accomplished between the studio teacher and the classroom teacher. Where possible, blackouts should be provided during the lesson to allow the classroom students time to discuss the points being brought out in the studio discussion. A bell or buzzer can be used to warn the classroom that the TV presentation will be resumed.

Most teachers want to be able to gauge student reaction by feedback. The group discussion portion of the lesson enables the classroom teacher to get feedback from the classroom students. The classroom teacher can clarify, elaborate on certain points, and assist those students who need help.

11. Interview

As a method of teaching, the interview is an informal conversation between two people for the benefit of a large group. In an informal interview, conversation tends to be in familiar idiom and easier to understand. The instructor guides the conversation by carefully chosen questions that explore areas and ideas of value and interest to the students. It is a method adaptable to most subject areas if the interviewee is selected with care. Students may participate by questions directed to the interviewee or through discussion led by classroom instructors after the presentation.

12. Panel

"Meet the Press" is a good example of a TV panel. As a method of teaching it is the exchange of ideas among carefully chosen panel members for the benefit of a large group. This approach to discussion allows a group which is well informed in a subject area to cover the basic ideas in an orderly manner. It conserves the advantages of small group discussion for the benefit of larger numbers. Use of the panel enables the instructor to promote constructive thinking among the panel members as well as the viewers. Panel members should be selected on the basis of knowledge of a subject, and capability to discuss it interestingly and in terms meaningful to the audience.

13. The Use of Problems

Problems as a teaching method are many and varied, ranging from individual problem assignments to group problem-solving exercises. Problems pose a challenge to students, an obstacle to overcome by reflective thinking, analysis, synthesis of ideas, and the application of knowledge and understanding. The objective of a problem-solving period might vary from the application of knowledge in a narrow subject area to a broad application of knowledge to several subject areas.

Television can be used to advantage for problem-solving lessons. With individual problem assignments the instructor can make sure that uniform instructions are given to all students. He can also insure that the best solutions are presented and explained after the assignment is completed.

Similarly group problem-solving lessons are adaptable to TV teaching. Facts and conditions of a problem can be presented to many groups at once, thereby giving each group a uniform base from which to operate. By careful monitoring and reporting on the progress of various groups he can control the rate of progress of the groups, and thus the rate of the entire class. He can prevent one group from spending too much time on a certain aspect of the problem or slow down a faster group.

14. Conducting Research

The next step in lesson planning for a telecast is to develop the background and knowledge in the subject area. Research for a TV presentation is in essence no different from an ordinary class period. A few adaptations, however, are needed in a television lesson. As the instructor researches his material he must constantly consider its appropriateness for the medium. For example, material that requires student responses is obviously unsuited for a TV lesson. On the other hand, the teacher may make excellent use of film clips, slides, panels, mock-ups, and a variety of other aids which would not be possible in conventional classrooms. One of the most important things to remember in this research process is to limit the subject to workable proportions. If the instructor has established his lesson objective and set forth his desired learning outcomes, then he has already established direction for his research. Keeping close to these points will insure that he doesn't get far afield and prepare extraneous material for the telecast.

LESSON PLAN

TITLE: Teaching by Television
CODE: AIC-465
INSTRUCTOR: Major John M. Blank, Jr.

PART I - OVERVIEW

LESSON OBJECTIVE: The objective of this lesson is for each student to know that televised lessons must be carefully planned in order to make the most effective use of the medium.

DESIRED LEARNING OUTCOMES: Each student should:
(1) know that the advantages and limitations of television affect its use in teaching.
(2) know that planning for a televised lesson is more complicated than planning for a conventional lesson.

INSTRUCTOR REFERENCES:
1. Carpenter, C.R., and Greenhill, L.P., An Investigation of Closed-Circuit Television for Teaching University Courses (Instructional Television Research Report Number Two), Pennsylvania State University, University Park, Pennsylvania, Spring 1958.
2. Costello, Lawrence F., and Gordon, George N., Teach With Television: A Guide to Instructional TV, Hastings House, New York, 1961.
3. Schramm, Wilbur L. (ed), The Impact of Educational Television, University of Illinois, Urbana, Illinois, 1960.
4. The Television Instructor, AU-9, Air University, Maxwell AFB, Alabama, 1965.

INSTRUCTOR AIDS: 35mm slides, 3x4 slides for film chain, and magnetic board with tabs.

STUDENT PREPARATION: Read Chapter 9, Principles and Techniques of Instruction, AIAOS.

HANDOUT MATERIAL: None

TIME REQUIRED: 45 minutes

PLAN OF PRESENTATION: The lesson will be introduced with a brief description of how television is being used in Air Force schools. The advantages and limitations of television will be explained and examples given. Finally, televised lesson planning procedures will be explained and compared with conventional lesson planning procedure.

PART II - TEACHING GUIDE

STUDENT OUTCOMES	STUDENT ACTIVITY	INSTRUCTOR ACTIVITY
	INTRODUCTION	
1. Realize that the Air Force is making extensive use of television in its schools.	1. Listens and takes notes.	1. Describes how television is being used in Air Force schools: a. Air University b. Air Training Command c. Air Force Academy
2. Recognize that Air Force instructors may anticipate becoming television instructors.	2. Visualize instance where he might be presenting a televised lesson.	2. Describe trends toward expansion of televised instruction in Air Force Schools.

Figure 3. Sample lesson plan.

15. Organizing the Lesson

If the telecast is to be successful then it must be well organized. All main points and ideas must be related and support the lesson objective.

The introduction of the lesson is designed to arrest attention of the viewers, motivate them to want to learn, and to present the lesson outline or overview. The instructor should be aware and take advantage of the unique television techniques that may be used to enliven his introduction. Team planning between instructor and TV staff begins to pay visible dividends at this stage.

Any one of five patterns may be used to develop the lesson: time, space, reason, enumeration (topical), or problem solution. Each is discussed at length in AFM 10-4. Each is adaptable to a television presentation. Ordinarily, material should be organized so as to progress from the simple to the complex, the known to the unknown or the common to the rare. During the script conference (see Chapter 5, "Preparing the Telecast") the television staff will advise the instructor how he can best develop his main points using the characteristics inherent in the TV medium.

The conclusion of the telecast should forcefully summarize the key points in terms of the lesson objective. It should also motivate the students and establish closure. Closure can be made particularly effective with background music, the fade-out and other studio techniques.

Planning a telecast, like planning for any lesson, considers the instructor-student relationship. It must be student-centered at all times if learning is to take place. TV does not require the instructor to assume a new role just because he is before the cameras. The lesson is a matter of instruction, not entertainment, although humor and originality can assist the teacher to good advantage.

When planning to present a course on television, the teacher should plan activities to determine the progress of his viewers. Television lessons can be alternated with conventional lessons to give the instructor an opportunity to question his students and otherwise gauge their progress. It will also serve to re-establish student-instructor rapport as well as provide guidance for revision of future lessons.

16. The Lesson Plan

The written lesson plan is a record of the instructor's activities in planning the lesson. Preparing this plan is a necessary prerequisite to accomplishing a good television script. The lesson plan is divided into two parts, which are shown in sample lesson plan (Figure 3).

Part I of the lesson plan is an overview consisting of such general information as the lesson objective, the desired learning outcomes, references, and the plan of presentation. Part II, the teaching guide, helps the instructor view all the students' activities as well as his own in terms of what he wishes the students to gain from the lesson. Part II consists of a step-by-step list of student outcomes, student activities, and instructor activities. These items are listed in the three columns under appropriate headings, as shown in the sample plan. This part forms the basis for the audio column of the program script which will be covered in a subsequent chapter.

Review Questions

1. Why should desired learning outcomes be established prior to selecting the method of instruction?
2. What are the methods which demand student participation?
3. What type of student participation may be used in the lecture method?
4. Why is a lesson plan important to a televised lesson?

CHAPTER 4

Basic Television for the Instructor

MANY books have been written on the subject of television production and no two authors completely agree on all phases. Procedures, personnel and equipment will vary from one studio to another so there can be no definite assessment of the facilities available to you at a given television studio. No attempt has been made in this chapter to explain the "hows" but rather the "whats" and the "whys" of television production. We will, therefore, now discuss the equipment and personnel with which you, the instructor, will be working. A basic knowledge of television production helps to eliminate some of the fears confronting new television instructors, improves communication between the instructor and the television staff, helps the instructor to be at ease in the environment of television and, consequently, improves the effectiveness of the presentation.

17. The Production Crew

All television studios maintain a production crew of some kind. There are numerous crew positions which may be filled, depending upon available manpower and the extent of production work done by the studio. There are basically six positions necessary to put on a telecast.

The program director.—The instructor works more closely with the program director than any other crewman and receives more direct assistance from him than from other members of the TV crew. The program director is involved with the instructor from the initial script conference through the actual presentation. (The responsibilities of the program director as a member of the planning staff are discussed in Chapter 5, "Preparing the Telecast.")

Once underway, the program director assumes the responsibility for all elements of the telecast, and he is, or should be, in complete control, with all crewmen following his directions. The program director is in direct communication with all crewmen, either by voice or by the intercommunications system. Any cues or directions intended for the instructor, however, must be relayed by the floor director or cameraman by use of hand signals. (See Chapter 7, "The Instructor On Camera.")

Sitting in the control room, the program director gives instructions to all crew members, follows the script, watches the camera monitors, calls camera shots, gives audio and visual aid cues, and gives cues to the instructor. He has before him the program script which he uses as a guide to coordinate the efforts of the respective crewmen, and to integrate all separate elements of the presentation into a smooth, transitional telecast.

The technical director.—The technical director is the person who operates the switcher-fader unit to set up and achieve the desired picture changes and visual effects, such as cuts, fades, dissolves, superimposures, etc. He takes his cues from the program director, and is generally referred to as "the switcher."

In TV stations where remote controls for slides and film are built into the video console, the technical director may also operate the switcher-fader, select and change slides, cue film, and stop and start the film projector.

Depending upon the available manpower, the complexity of the presentation or the program director's personal preference, the program director may do his own switching, thereby eliminating the need for a technical director. In any case, the person who operates the switcher-fader is responsible for getting the picture from the desired

camera "on the air" at the right time with the right visual effect.

The audio engineer.—The audio engineer is responsible for all audio portions of the telecast including the sound from studio microphones, audio tape, record discs, film sound and sound from remote sources. He assists the program director in the selection of music, sound effects, and other audio aids, and is responsible for taping these audio aids before the telecast.

Immediately prior to the telecast, the audio engineer places and adjusts the microphones to be used, obtains voice levels from the instructor, and cues audio tapes and record discs to be used.

During the telecast, the audio engineer operates the audio tape recorder, the turntable, and the audio console (audio mixer), controlling sound levels and bringing sound in and out of the telecast as required.

The video engineer.—The video engineer is responsible for the technical quality of the visual portion of the telecast. Prior to the telecast he electronically builds the pictures on all cameras to be used, adjusting the controls to achieve the best possible picture.

During the telecast, the video engineer sits at the video console, keeping a close watch on the camera controls, maintaining the required signal level, and making adjustments as required.

The cameraman.—Before air time, each cameraman sets up his first camera shot, positions the camera for desired distance and angle, selects the lens, focuses the image, composes, balances and frames the picture, and waits for the telecast to begin.

During the telecast, while one camera is on the air, the operator of the other camera sets up his next shot so that he is ready with it when the program director calls for it. When his camera is on the air, he may hold the same shot until his camera is "off the air," or he may be required to follow the instructor about the set, moving the camera, focusing the image, and maintaining balance and framing. When there are more than two cameras used, the cameras which are not on the air are being readied for their next respective shots.

The floor director.—The floor director is the communication link between the instructor and the program director. During the telecast, all cues and signals intended for the instructor are relayed to him by the floor director, who utilizes a form of sign language called "hand signals." (See Chapter 7, "The Instructor on Camera.")

The floor director may, in addition to relaying cues and signals, perform other duties such as holding or changing cue cards, operating cuing devices, moving props and visual aids, assisting in moving camera cables, etc. If the presentation is complex, he may have an assistant who performs such duties. In telecasts of a very simple nature, a floor director would normally not be required and the instructor would receive his cues from one of the cameramen.

18. Camera Movements

Uses of camera movement.—Almost all studio cameras are equipped with a mechanism which permits free movement of the camera, both horizontally and vertically, and a set of wheels which permits movement of the camera and its supporting base about the studio floor.

There are eight basic uses of camera movement in a telecast. They are:

- To obtain pleasing picture composition and framing.
- To add or delete material in the picture.
- To change the scene.
- To maintain a relative distance or angle from the subject, when the subject is moving.
- To simulate motion within the scene.
- To achieve variety.
- To assure continuity.
- To produce a dramatic effect.

Explanation of camera movements.—The terminology used in describing camera movements is purposefully standard in order to avoid misinterpretation or confusion. There are five basic camera movements and any of them may be combined to achieve almost complete mobility. The five basic camera movements are shown in Figures 4a–4e.

19. Camera Shots and Lenses

The television camera is the student's viewpoint, in that the student sees only what the camera sees. A camera "shot," then, is a scene which contains whatever visual material the instructor wishes the student to see.

Camera shots.—One way of describing camera shots is by specifying the relative distance from the student, via the camera lens, to the center of interest. A shot may be long, medium, or close-up only in relation to other camera shots that are

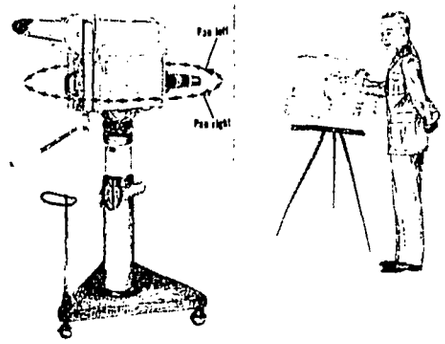


Figure 4a. Pan.—A rotation of the camera up to 360° on a horizontal plane around a fixed axis. The direction of the movement is designated by "pan left," or "pan right."

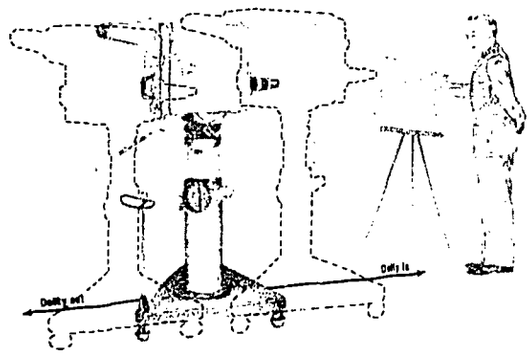


Figure 4c. Dolly.—A movement of the camera and its supporting base about the studio in a line from the front of the camera to the subject. The movement may be toward the subject—"dolly in," or away from the subject—"dolly out."

used with it. As we go from a long shot to a medium shot, to a close-up using the same center of interest, the student moves progressively closer, seeing less of the subject. For example, a long shot may show the instructor from the knees up, however on a close-up the instructor's head and shoulders would fill the frame (Figure 5).

Another way of describing camera shots is by specifying how much of the instructor should be in the picture. The instructor's anatomy is used to describe this type of shot: therefore, a knee shot means that the instructor is in the picture from his knees up; a waist shot, from the waist up; bust shot, from the bust up; and a shoulder shot, from the shoulders up.

The number of the centers of interest in a given camera shot affords another way to de-

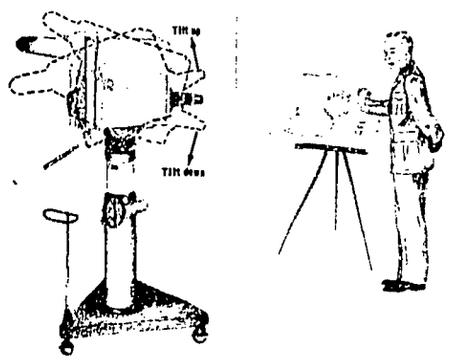


Figure 4b. Tilt.—A rotation of the camera up to approximately 180° on a vertical plane, around a fixed axis. When the front of the camera is pointed up, this is a "tilt up" and when the front of the camera is pointed down, this is a "tilt down."

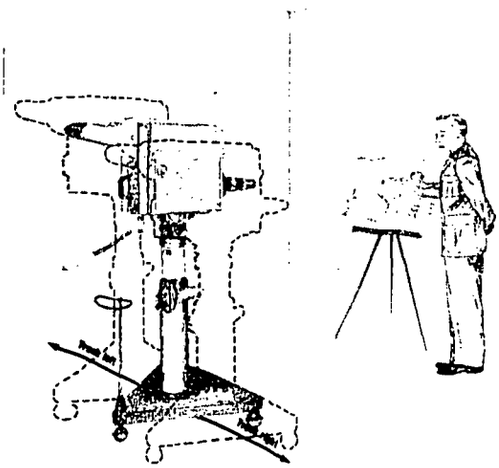


Figure 4d. Truck—A movement of the camera and its supporting base about the studio floor parallel to a horizontal line drawn through the subject laterally. The direction of the movement is either "truck right" or "truck left."

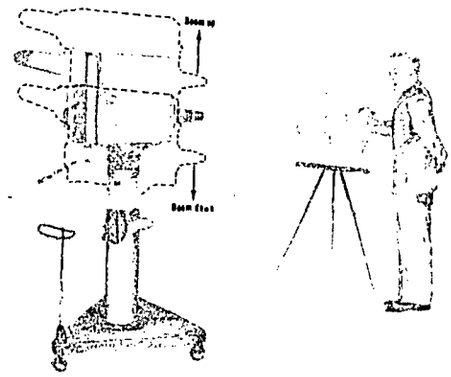


Figure 4e. Boom.—A movement changing the distance of the camera from the studio floor. The extent of a boom movement is dependent upon the type of equipment used and some types of camera equipment cannot "boom" at all. The directions of movement are, of course, either "boom up" or "boom down."

scribe shots. A shot with two centers of interest, for example, two instructors in the same picture, is called a two-shot, three centers of interest, a three-shot, and more than three, a group-shot.

One other type of shot which is used rather frequently in television is the cover shot. Many times when there are two cameras available, the program director will assign the close-ups to one camera and will assign the responsibility to the other camera of staying with the instructor so that he is "covered" as he moves about the set. (See Chapter 7, "The Instructor on Camera".)

Lenses.—The camera lens serves as the eyes of the student. Basically speaking, light is reflected into the lens which in turn focuses the light onto the face of the pickup tube in the camera. From there the image is reproduced electronically and conveyed to the classroom monitor where the student sees it.

Most cameras have a lens complement of four lenses which are screwed into a rotational device called a lens turret, mounted on the front of the camera. The turret is rotated from the rear of the camera until the desired lens is lined up with the pickup tube in the camera. When any one of the four lenses is lined up with the pickup tube, that particular lens is referred to as the "hot lens."

The lens complement usually includes a 50mm lens which is a wide angle lens giving a wide angle of view. The 90mm and the 135mm lens are also standard and provide a progressively narrow angle of view but more magnification. The 8½-inch telephoto lens is found in most lens complements. It provides a very narrow angle of view and is used almost exclusively for close-ups. Some types of cameras employ a lens complement consisting of 1-, 2-, 3-, and 4-inch lenses in the same manner as the lenses mentioned above (Figure 6).

The zoom lens is a special type of lens whose focal length can be changed while the camera is on the air. As the focal length changes, so does the angle of view. The zoom can go from a long shot to a close-up and back again without losing focus or changing lenses. The zooming effect is similar to that of a fast dolly movement, however, the camera itself does not move when zooming.

20. Switching

A great amount of flexibility can be achieved through the use of camera movement and a lens complement which provides a variety of lenses. If the program director were to use only one camera to go from one scene to another, or from a long shot to a close-up by camera movements and lens changes, the resulting effects would be annoying to the student, and picture continuity, in most cases, would be poor. Most studios have at least two studio cameras, each possessing mobility and the flexibility of a lens turret. While one camera is on the air, the other camera is being moved into position, the required lens selected and it is focused for the next shot.

Selecting the picture.—The electronic capability of switching from a picture on one camera to a picture on another camera improves the picture continuity of a telecast and adds flexibility. The program director selects the next picture that the student is to see, and the switching from one camera to the other is accomplished through the use of a switcher-fader unit (Figure 7). The fader knobs of this unit and the rows of buttons, each button corresponding to a camera, enable the person doing the switching to cut from one camera to another. The effects that can be achieved depend upon the kind of switcher-fader used.

Switching effects.—There are four basic effects that can be achieved by most switcher-fader units:

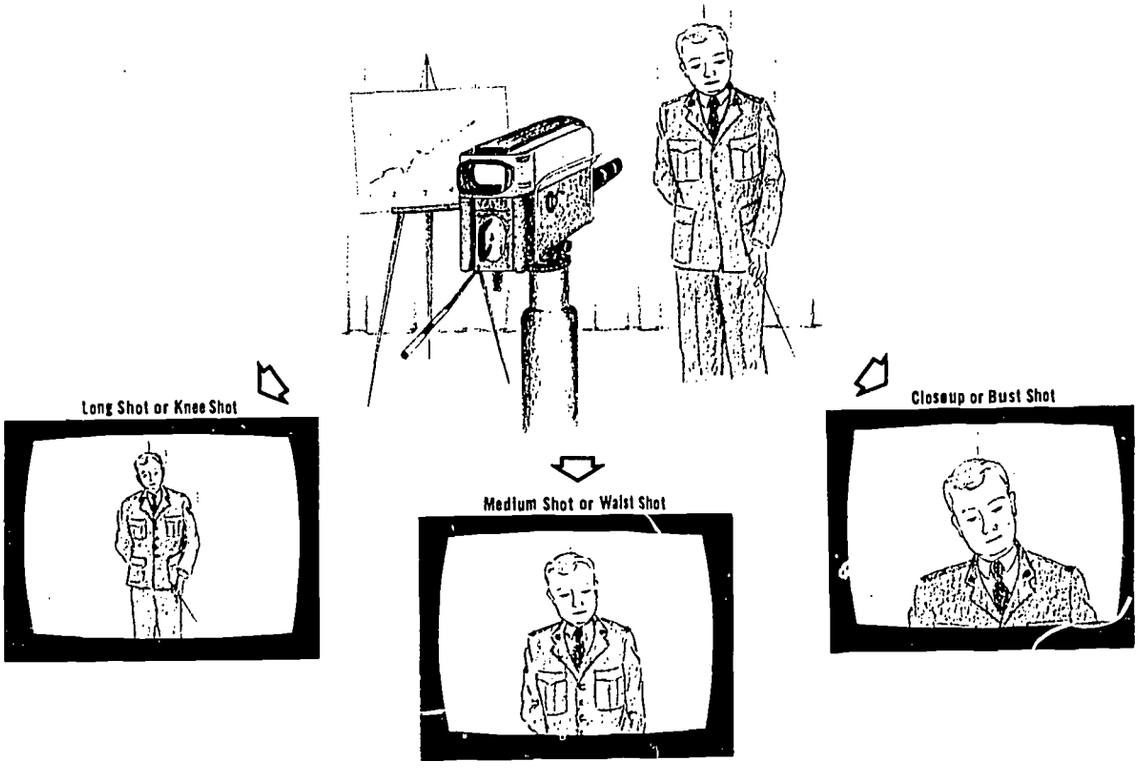


Figure 5. Relative camera shots.

- Cut. This occurs when the viewer's picture is switched instantaneously from the picture on one camera to the picture on another camera. This effect may also be referred to as a "take."
- Fade. This effect may be called either a "fade in" or a "fade to black." To fade in means to increase the image intensity of a picture from zero to full intensity. The fade to black is the direct opposite in which the image intensity of a picture is diminished from full intensity to zero.
- Dissolve. This technique serves to diminish the image intensity of one picture to zero and increase the image intensity of another picture at the same time. It gives the effect of a different picture from each of two cameras on the air at the same time. As one picture fades out, the other fades in.
- Superimposure. This is the point in a dissolve where the visual material from each camera can be seen clearly by the student. "Supers" can last for any length of time and they are most useful in TV teaching. One example of a super is for key words or phrases to suddenly appear across the instructor's chest and just as suddenly disappear when they are no longer needed.

21. Lighting

Since average room light levels are not generally sufficient for television, additional light must be introduced on the set to produce a satisfactory picture signal. The amount of light required to light a set will vary with the subject and the type of equipment.

Most television studios have an overhead pipe grid from which lights are suspended (Figure 8). The grid provides a capability for lighting almost any portion of the studio from all directions. The lights and light cables are not in the camera's way and neither the camera nor camera operator can block the light. Portable floor lamps are sometimes used in set lighting to fill in dark areas or as a low level light to eliminate or "wash out" shadows.

When you walk onto a lighted set, there will be lights of varying intensity shining on you from different directions. A set is lighted with three basic lighting objectives in mind:

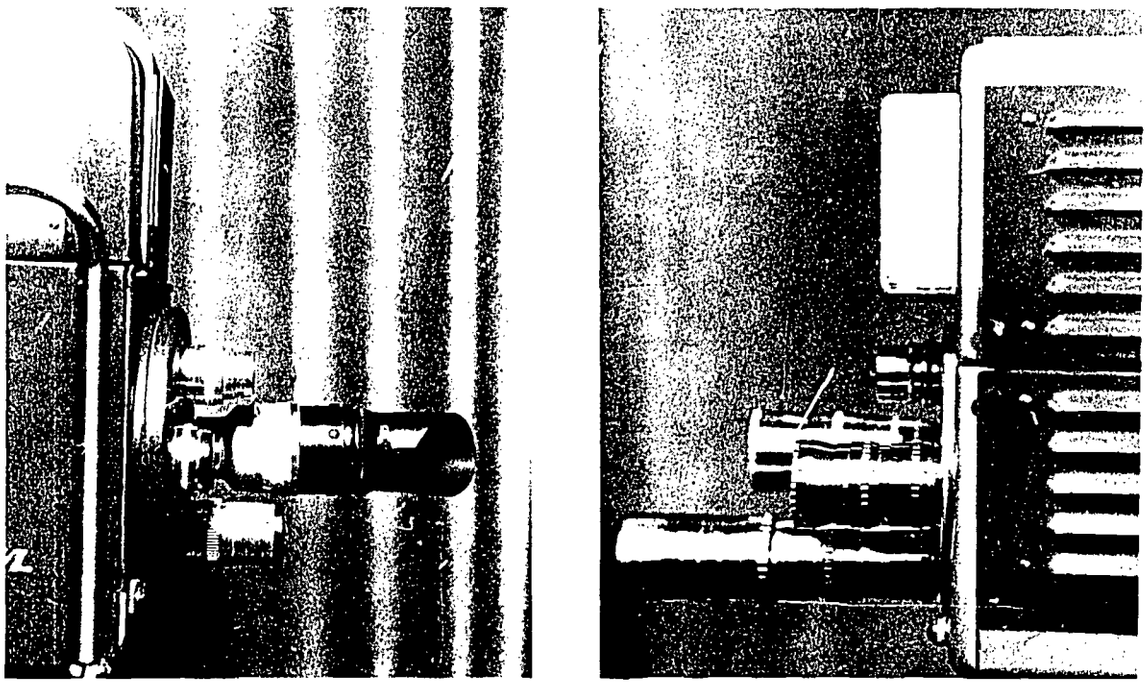


Figure 6. Lens complements of two different types of TV equipment. Left—50mm, 90mm, 135mm, and 8-½ inch lenses. Right—1-inch, 2-inch, 3-inch and 4-inch lenses.

1. To provide a main source of illumination.
2. To separate the subject from the background, bringing out the three dimensional quality.
3. To fill in shadow areas not washed out by other lights.

The physical characteristics of the instructor, such as skin tone and hair coloring, determine how he is to be lighted. An instructor with light complexion and light hair wearing a light suit requires less light than a dark-complexioned person with dark hair wearing a dark suit.

Objects having a "glossy" finish such as jewelry reflect light into the camera lens. The resulting effect is a black blob in the picture, commonly referred to as "bloom." A bald head frequently presents a lighting problem since it can also reflect light, however, makeup can correct this. (See Chapter 8, "The Instructor on Camera.")

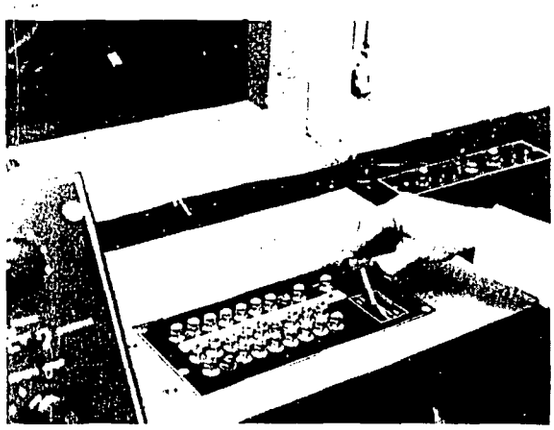


Figure 7. Switcher-fader unit.

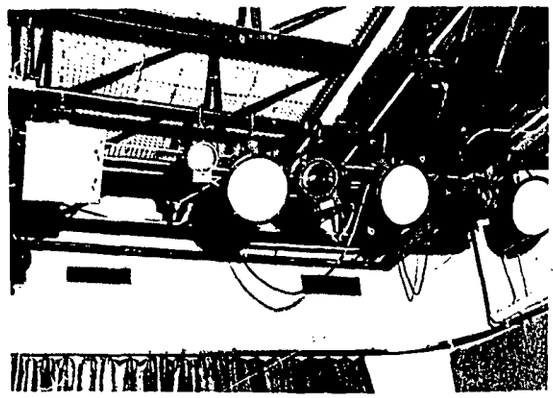


Figure 8. Studio lights are suspended from overhead pipe grid.

22. | Audio

Television is not entirely a visual medium. It combines picture with sound, and would be somewhat lacking if the audio portion of the lesson were left out. The audio and the video should complement and clarify each other. Since sound, like the picture, must be electronically reproduced, microphones and recordings must be used to reproduce sound.

Microphones.—Several types of microphones may be used, such as the lavalier, table and boom microphones.

Lavalier.—The most popular microphone used by instructors is the lavalier which is a small microphone normally suspended from a cord around the instructor's neck. The cord permits free movement since the microphone goes wherever the instructor goes within the limits of the microphone cord. The lavalier is small, compact, and unobtrusive.

Table microphone.—Any mike mounted on a short stand which sits on the table or desk is called a table mike. Some table mikes are bi-directional and others have a multi-directional pickup with different coverage patterns so that more than one person can use the same microphone. The table mike restricts movement in that the instructor cannot move out of the microphone's pickup pattern.

Boom microphone.—The boom microphone is simply a microphone suspended from a long pole or boom. Microphone movement and pickup direction is controlled by a boom operator so that the microphone stays a constant distance from the instructor, and the "live" side of the mike is pointed toward him. The boom affords the instructor unlimited movement about the set and does not encumber him with a mike cable.

Recordings.—The two types of recordings most frequently used are audio tapes and record discs.

Audio tapes.—Most studios possess at least one audio tape recorder. Sound portions can be taped before the telecast, permitting erasing and retaping until they are perfect. Existing tapes made with practically any conventional tape recorder can be utilized since most audio tape recorders used in TV studios have at least a two-speed capability. Audio tape can be cut and a portion from another tape spliced in. Most studios have the capability of taping sound from the turntables or from film. Many times the entire audio portion of the telecast, other than the instructor's voice, is recorded on a single tape. This makes cuing easy and places all of the sound portions at one source.

Records.—The record turntable is standard equipment in most television studios. The turntable generally has three speed settings so that records which play at 33⅓, 45 or 78 RPM may be used. Records, unlike audio tape, may get scratched, cracked, or warped, and become unusable. The most common use of records in television teaching is for theme music and sound effects.

Sound on film.—Sound on film is another audio source which may be used in conjunction with the film picture or independently with a picture from another source. The instructor may use the film picture without the film sound or he may use film sound without the film picture, depending upon what he wishes the student to hear and see.

Audio Mixing.—The audio console (Figure 9) or audio mixer is the equipment which controls the selection and volume of all sound leaving the studio or control room. Each audio source has a volume control and an off and on switch, so that sound from a given source can be cut on the air or off the air. Sound can be faded in or out as called for. Sound can be "cross faded" so that as one sound fades out, the other fades in. Sounds can also be superimposed over each other. For example, the instructor is talking while music is heard faintly or the instructor is heard over the sound of an airplane engine.

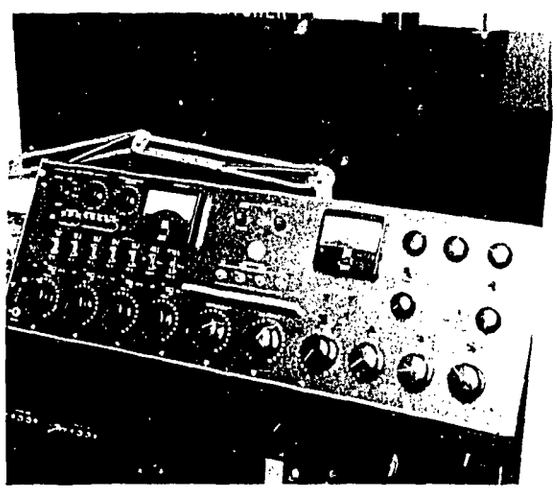


Figure 9. All sound is controlled from audio mixing unit.

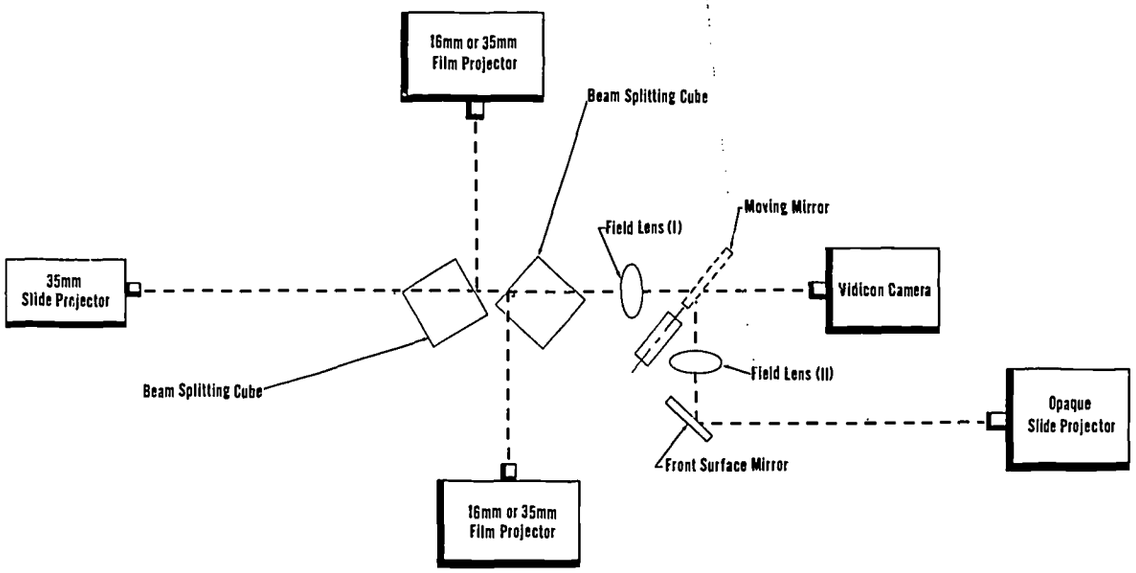


Figure 10. Diagram of a multiplexer unit.

23. Films and Slides

Film projection.—The 16mm film projector is standard equipment. Every television studio will possess at least one and most of them will have two. Any 16mm film can be used in part, or in full, as long as the film is in good shape. Color films can be shown over black and white television systems, however, they appear on the monitor as black and white.

Slide projection.—The 2″x2″, 35mm slide projector is the most common used in television. Some studios have the capability for showing 3¼″x 4″ glass slides so that existing auditorium slides can be used. Some studios have a homemade light box for showing transparencies since overhead projection in most cases is washed out by the studio lighting. Rear screen projection can be accomplished using either the 2″ x 2″ or the 3¼″ x 4″ slides.

The multiplexer.—This is a system of mirrors or prisms which allows more than one projector to be fed to a single film-pickup camera (Figure 10). The multiplexer is stationary and is usually used in conjunction with two film-pickup cameras, two 16mm film projectors and two 35mm slide projectors with rotating drums. Smaller studios may possess only one camera, one film projector and one slide projector in conjunction with the multiplexer. The 3¼″ x 4″ slide projectors are still used with the multiplexer in some studios where the requirement for showing these slides exists. The multiplexer is only one part of the projection system; however, through common usage the word has come to mean the system of mirrors and all projectors used in connection with it.

The projection system is operated from the control room placing the responsibility for showing the visuals on the program director. The multiplexer affords the selection of any of the associated projectors to be fed to the pickup camera.

Review Questions

1. What member of the production crew is the most involved with the telecast?
2. Describe the five basic camera movements.
3. What is a "camera shot"?
4. What is the "hot" lens?
5. What physical characteristics of the instructor determine how he is to be lighted?
6. What sources of sound effects can be used in television?
7. What is a multiplexer?

CHAPTER 5

Preparing the Telecast

NOW THAT you have an outline and lesson plan, you are ready to start building a television lesson. The purpose of this chapter is to provide sufficient guidance for the instructor in the preparation of a lesson to be televised. An unprepared televised lesson will be no more effective than a lesson presented in the auditorium or in the classroom.

The preparation time required varies with the television teaching experience of the instructor and the complexity of the lesson to be presented. The adaptability of the individual instructor to television teaching is also a determining factor in the amount of time required to sufficiently prepare a lesson for television.

24. Program Assistance

Whether the instructor presents a single telecast or a series, certain personnel are available to assist him with his program. These personnel are experienced in television and will work directly with the instructor.

The television coordinator.—In most schools, there is a person responsible for the overall television mission. He advises the faculty on the uses of the television system and the selection of content areas which could be improved by the use of television. He plans, schedules, and coordinates the programming of all telecasts, and assumes the responsibility for their production quality and effectiveness. The title of this position will vary from one organization to another, however, the responsibilities are generally the same, and he is usually called the television coordinator.

The program director.—One responsibility of the program director is to advise and assist the instructor in the planning, preparation and use of the script, and instructional aids. He will also stage the presentation, conduct rehearsals, and coach the instructor on television teaching techniques and other areas of production. In short, his task is to achieve a fluid, unfaltering presentation. The person who does all these things may be called the production director or producer-director, however, the duties and responsibilities are generally the same.

The graphic artist.—There are very few television presentations which do not include some visual aids, therefore the artist is an important contributor to the television presentation. He will advise the instructor on what types of visual aids to be used and when and where to use them. Usually the artist will suggest, visualize and prepare the visual aids for the instructor. Most television installations have an artist-illustrator who works exclusively in the television medium since there are distinct differences in the preparation of art work for television and art work for other instructional media (see Chapter 6, "Instructional Aids for Television").

Some installations may have a visualizer who advises on the use of visual aids and visualizes them. He then makes preliminary sketches and sends them to the graphic aids department which actually makes the aids.

Other television stations may not have an artist. If no artist is available, the program director will advise on the use of visual aids, and will coordinate with the graphics aids department on the actual making of the aids.

The technical writer.—Most instructors are required to write their own scripts. Some installations employ technical writers who take the outline resulting from the instructor's research and arrange this material into an effective speaking script. Some schools only require the instructor to present the material, and a technical writer

does the research, outline, and the arranging of the material.

25. Program Conferences

The initial script conference.—Following the decision to televise a lesson, the instructor should contact the television coordinator and schedule a script conference. At this conference the instructor discusses the lesson plan and the outline of his lesson with the television staff.

In this initial script conference, the instructor is concerned with the content and delivery of his lesson. The television staff is concerned with the production techniques and materials required to accomplish the objectives of the presentation.

The program director and the graphic artist are usually the television personnel who work with the instructor in the initial script conference. Other personnel may attend, such as the television coordinator, the instructional aids consultant or other persons concerned with the curriculum.

Ideally, this initial meeting will provide an opportunity to discuss and agree upon the treatment, settings, and format of the presentation as well as to schedule other conferences, rehearsals, and the actual telecast.

The visual aids conference.—Some installations prefer to have a visual aids conference between the instructor and the artist after the instructor has had an initial script conference with the program director. The instructor should bring to this meeting any visual material he might have as well as any ideas he might have for further visualization of the content material. The entire presentation should be talked through, discussing visuals, sketching, etc. The "talk through" is a major step in the creative process of the presentation. It provides the artist with an explanation of what his visuals should describe and helps the instructor to organize his commentary before he writes the script.

To save time and to prevent duplicated effort, the visual aids conference is usually combined with the script conference. This will be discussed later in the chapter.

The final script conference.—After the instructor has had time to write his script, incorporating the results of the initial script conference, and the artist has most likely completed the visual aids, a final script conference is held. This is the time to make final decisions on the television approach to the lesson. The method and mood of the presentation will be determined. The set design, staging, use of audio-visual aids, props, etc., will be discussed and finalized, and a "walk through" rehearsal is scheduled.

Depending upon the complexity of the lesson to be televised and the experience of the instructor, any of these conferences may be combined. There should be as many meetings with the television staff as the lesson requires. Regardless of how many conferences are required or what they are called, the important thing is for the instructor to know that there are personnel available to advise and assist him. He should have confidence in the television staff and should follow their suggestions since they are as anxious to present a good lesson as is the instructor. The instructor should be free to concentrate on his area of responsibility, that of organizing and presenting the material.

26. Preparing the Script

The script should be prepared using the standard television format. The left one-third of the page is left blank for video information where the program director writes in his notes on cameras, lenses, cues, etc. The right two-thirds of the page is for the instructor's material.

The verbatim script.—Where exact wording is essential, the verbatim script (full script) may be used. This means that every word the instructor intends to say is written in the script (Figure 11). A verbatim script is suitable for narration, formal addresses, and dramatic or documentary presentations. The program director can visualize and picture the complete presentation before going into rehearsal. The program director has definite cue lines and knows what the instructor is going to do and say next.

In writing the verbatim script, type what you plan to say in the "audio" column. Identify major movements and points where instructional aids are to be shown. One good way to outline movements and aids is to box in this information so that it is not confused with the dialogue (Figure 11). Dialogue should be in upper and lower case letters. All other instructions or identification should be in capital letters only. Type double-spaced on one side of the page only.

Some rules should be observed when writing for television. The most important rule is that the writer of dialogue should choose his words, not by how they look on paper, but by how they will

VIDEO	AUDIO
	introduce Captain Anderson, who will discuss the propulsion system of the missile.
	Instructor "C" STANDING AT COUNTER Thank you, Mr. Fortune. I know all of us have seen missiles take off and go into space but how many of us really know how thrust works in pushing the rocket into space.
	INSTRUCTOR RELEASES BALLOON This balloon is a good example of how a rocket or missile works. (That looks like a "misguided missile") The principle that it works on is Sir Isaac Newton's third law of motion, which is: To every action there is an equal and opposite reaction. The action in this case is the air rushing out the neck of the balloon. INSTRUCTOR HOLDS UP DRAWING The reaction takes place when the air pushes against the closed end of the balloon as the air rushes through the neck of the balloon.
	SLIDE 15-9; INSTRUCTOR MOVES TO PROJECTION SCREEN This cannon is also an example of action and reaction. The burning powder expands and pushes the cannon ball out the barrel; this is action. At the same time the expanding gases are also pushing at the closed end of the barrel pushing the gun carriage backwards; this is reaction.

Figure 11. Sample verbatim script.

sound when spoken. Narrative should be prepared in a conversational style using natural sounding contractions and sentences. The instructor should keep concern for the student uppermost and present his material in easy-to-understand, simple terms.

There are some disadvantages in using a verbatim script. The program director must follow the script carefully, placing an additional burden on him since he already has so many things to do during the telecast. Should the instructor forget to give the exact text, the shooting procedure and consequently the overall presentation may be seriously affected.

The outline script.—Most instructors communicate better when they teach from an outline especially prepared for television rather than from a verbatim script which they must read or memorize. An outline allows the instructor more freedom to concentrate on his demonstrations and instructional aids.

The outline script differs from the verbatim script in that the complete narrative is replaced with an outline containing topics, key words or phrases, major movements, and visual aids sequence (Figure 12).

In writing the outline script, type in the "audio" column a simple orderly outline of all subjects to be discussed, plus key words and phrases, major movements and visual aids sequence. Dialogue should be in upper and lower case letters. Major movements and visual aids should be in capital letters and boxed in. Type double-spaced one side of the page only. Leave the "video" column blank. The program director will write in his own notes for cameras, lenses, cues, etc.

The opening.—Attention-getting openings are most important in television teaching. Films, slides, live action and a little imagination together with recorded or live sound can be utilized to create a good attention-getting opening.

A lesson which is not a part of a series should be treated individually and should have an opening relating to the subject matter covered in the lesson. For a series of lessons, a sequence should be used that can be presented for each presentation in the series, setting the tone of the sequence. Each time a new series is presented, a new standard opening should be devised to match.

The closing.—The closing should be prepared with as much care as the opening. The student should be left with a pleasant impression of the presentation. A lesson which is not a part of a series should be treated individually with a closing to suit the subject content of the lesson. A series should have a closing to fit the tone of the series.

Slides.—When indicating slides on the script, the following information should be contained in the "audio" column of the script:

1. The slide number (all slides should be numbered consecutively and used in that order).
2. A brief descriptive title.

Films.—When indicating film on your script, place the following information in the "audio" column:

1. The word "Film" if only one film is to be used.
2. If more than one film is used, "Film Clip #1," "Film Clip #2," etc.
3. A brief descriptive title of each film clip used.
4. If the sound track is to be used, write in the abbreviation "SOF" (Sound on Film). If the instructor is to supply the commentary from the studio, write in "Voice Over."

Recordings.—When indicating recordings on your script, the following information should be included in the "Audio" column of the script:

1. Record title.
2. Selection title.
3. Side and cut number.
4. If the instructor speaks over the sound, indicate as "Voice Over." When audio tape is used, give the tape number and cut number.

27. Rehearsals

The dry run.—After you have written your script, it is a good idea to dry run your material until you are thoroughly familiar with it. Some instructors prefer to rehearse their material in front of a mirror so they can watch their expressions, movements and gestures. Other instructors draft a member of the family or a roommate to be their audience. The presentation should be read through at first, then as you become more familiar with the material, less and less reliance on the script should be allowed. Dry runs help to eliminate flaws in content, help the instructor to know his material, and help clarify in the instructor's mind the television techniques that are required.

VIDEO	AUDIO
	TALBERT - WILL ASK QUESTION KELLENBERGER - WILL BEGIN DISCUSSION ON EFFECTS 1. Thermal Radiation (statement) a. Misconceptions b. Relate fireball to sun Size of fireball [CHART] [MOVE TO CHALKBOARD] and explain c. Explain fireball (1) Formation (2) Movement (blast wave) (3) Two pulses (4) Firestorm (brief) TALBERT - WILL ASK ANOTHER QUESTION KELLENBERGER - WILL EXPLAIN 2. Heat transmission a. Movement b. Height [CHART] TALBERT - WILL ASK QUESTION KELLENBERGER - WILL EXPLAIN 3. Thermal damage a. How it affects objects [CHART] How paper ignites b. Type of damage to humans [CHART] 1st and 2nd degree burns

Figure 12. The instructor prepares the audio column of this outline script.

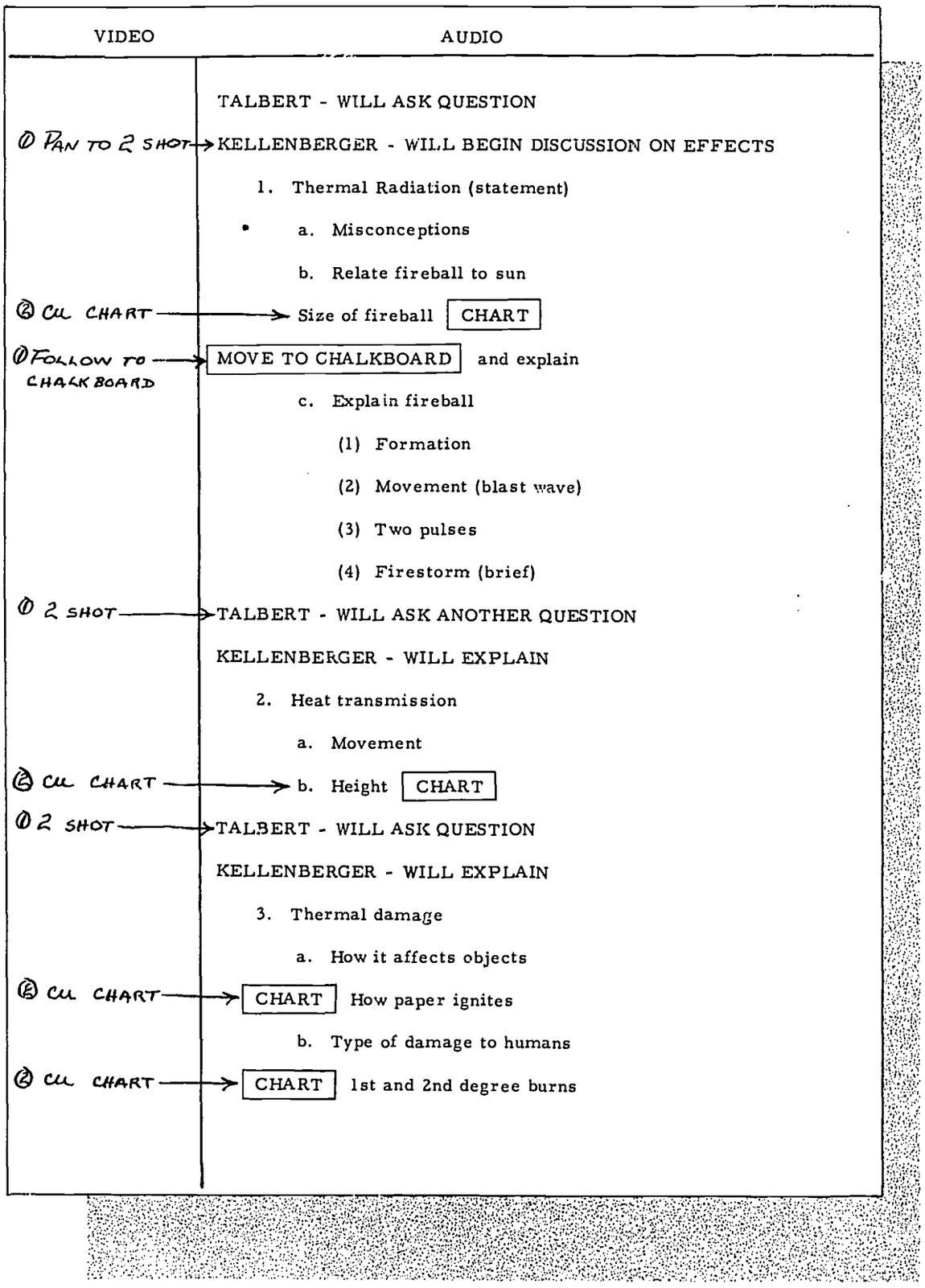


Figure 13. The program director completes the script by filling in the video column.

The walk through.—This rehearsal is held in the television studio without cameras. The desks, chairs, chalkboard and other visual aids devices are positioned as they will be for the actual presentation. A "walk through" should include the visual aids, demonstrations and all major movements involved in the presentation.

As the instructor walks through the presentation, the program director makes his notations in the "Video" column of the program script. Here he notes such things as the specific camera which is to take each shot, the type of shot required, and any other cues that he thinks necessary (Figure 13).

The "walk through" is important in saving camera rehearsal time since the program director already has a general idea of how the presentation is to be handled. He can then concentrate on directing the camera rehearsal with a minimum of stopping to block out camera shots.

The camera rehearsal.—The final area of preparation is the camera rehearsal. Here all elements of production are brought together. Visuals are ready, the program director has plotted the camera action, and lights, sets and props are arranged. Camera shots are coordinated with the action. The program director is in charge of all proceedings.

The program director starts the rehearsal with the shots he has blocked out during the "walk through," modifying some, killing some, and adding others until the presentation is tied together as a unified whole. At times, slight revisions will be made and the introduction, conclusion, transitions and rough areas may receive additional rehearsals. Usually, the camera rehearsal is interrupted only when a mistake has been made that cannot be corrected at a later date or time. Minor corrections are made after the camera rehearsal. The instructor should have as many camera rehearsals as it takes to present a smooth and polished telecast, and no fewer.

A final rehearsal (dress rehearsal) is usually scheduled as close to the actual presentation time as possible. Here the presentation should be perfected and in its final form, everything exactly as it will be when the presentation goes "live." No changes should be made in the presentation after the final rehearsal. Such changes can lead to confusion by one or more of the many personnel involved and this could jeopardize the final presentation.

Where presentations are being taped, the final rehearsal may be videotaped and if satisfactory, the final presentation is eliminated altogether. If the video tape of the final rehearsal is not satisfactory, it serves as a basis for critique prior to the final presentation.

Review Questions

1. What is the purpose of a script conference?
2. What are the advantages of an outline script as compared with a verbatim script?
3. Why is a walk-through important?
4. Why is the standard, two-column television script recommended?
5. How many camera rehearsals should an instructor have for a given presentation?

CHAPTER 6

Instructional Aids for Television

TELEVISION is primarily a visual medium of communication: thus, to present a televised lesson without the effective use of visual aids would be like a Frenchman trying to talk with his hands in his pockets.

Both audio and visual aids are important to the television presentation and serve distinct and planned purposes. The instructor who selfishly allows his students to view only himself for the entire lesson with few graphic distractions may find it hard to hold their attention. On the other hand, the instructor who fills his screen with charts and pictures to illustrate ideas which need no explaining can very easily confuse his students. The purpose of an aid is to make an idea more vivid by appealing to additional senses—to clarify a concept or thought which cannot be described adequately by words alone. The trick is to analyze the lesson content and determine where an aid can serve a positive purpose toward accomplishing a learning objective.

28. Choosing the Right Aid

Visual aids for TV.—If one were to try to list the reasons for using an audio or visual aid on television a partial list might be made as follows:

1. To arrest the attention of the viewer.
2. To capture and reinforce his interest.
3. To illustrate functions, methods, and ideas.
4. To increase understanding and clarity of ideas.
5. To convey visual information.
6. To make the presentation more varied and dramatic.
7. To contribute to the setting of scene or mood.

It is easy to see from such a list that the use of instructional aids generally falls into three categories: motivation, explanation and variety.

Motivational aids.—It is an essential practice of TV teaching to appeal to the viewer's motives for learning or perhaps to provide him with a motive to learn, to remember and to put into play the knowledge and skills he is taught. Thus, motivation in television is primarily allied with the opening and closing of the lesson. The tenets of showmanship—open with a bang and leave 'em begging for more—are as applicable to television as to the stage. Perhaps this is true because the television performer, whether he is a comedian or a teacher, must bring his audience right into the picture with him, establish rapport, and make the viewer feel a sense of personal participation in the scene. Motivational aids are not limited to the opening and closing of a program, but generally in TV the effort of motivation should be to make the student want to watch the lesson and remember it afterwards. Some motivational aids are the *attention getter,* such as the use of sound and film clips; the *curiosity bit,* wherein an incomplete scene is shown, or the audience is teased by a peek behind the scenes; *the startling fact* such as the use of astronomical statistics or presenting a threat to the viewers welfare; and *the emotional appeal* as is the case of martial music, patriotic speeches, etc.

It is not possible, of course, to appeal to everyone to the same extent with a motivational effort. The instructor can expect to alienate a few viewers in motivating the majority. The best policy is to pitch the entire lesson, its opening as well as its content, to the expected audience.

Explanatory aids.—The great bulk of instructional aids on TV fall into this category. These are the pictures that are worth the thousands of

words—but only if words cannot properly explain the concept or idea.

There is still a requirement on TV to diagram cut-away views of objects which cannot be taken apart. However the use of charts. or pictures of small objects which otherwise could not be seen, is eliminated in TV by using close-up camera shots of the actual object, sometimes called *realia*. The use of television does not lessen the need for aids to explain complex thoughts or concepts—it simply makes it easier to use the visuals. It can also encourage the overuse of visual aids to overexplain or belabor the point, therefore, the instructor should insure that every aid has a purpose.

Aids for variety.—Perhaps this use of audio and visual aids will seem to contradict the cautions stated above. Certainly aids will be used to provide a variety of stimuli in order that the impression be more vivid and retained longer. A good example of this concept is the use of verbal listings on charts which the instructor calls off one at a time while both he and the student read it on the chart. In effect, there are two senses being used—sight and hearing—which should be better than only one. However, this multiple stimuli reinforces only the memorization of the words and not the understanding of their meaning. A different visual, perhaps illustrating the idea that the words convey, would be a better use of the chart. Here the variety of visuals would sustain the interest of the student and undoubtedly increase his understanding as well.

29. Displaying Aids on Television

Not only is the selection of the right aid important but the manner in which it is presented to the viewer is also a matter requiring careful consideration. It may be presented with or without the instructor appearing in the scene. It may be a close-up or a two shot. It may require motion to achieve transition and it may require a buildup of several ideas to complete a picture. Interest, understanding, and retention are all affected by the manner in which a stimulus is presented to the student.

The film camera chain.—One of the most versatile ways of displaying visual material on television is the film camera chain. This piece of equipment projects transparent visuals, slides and movie film directly into a camera and by use of the multiplexer most studios can handle several

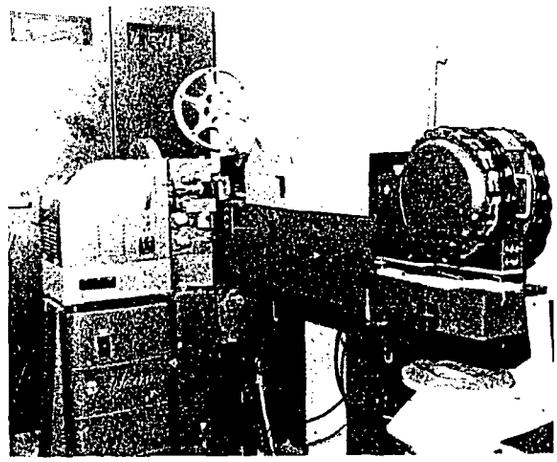


Figure 14. Film camera chain (multiplexer).

sizes of slides as well as 16mm. sound films (see Chapter 4, "Basic Television for the Instuctor").

The most important display feature of the film chain multiplexer arrangement is the ability to switch quickly from slide to slide, regardless of size, and to motion pictures. This effect of rapid transition would be almost impossible by any other means.

Rear projection.—There are times when the instructor would need to work before the camera with a projected aid. It is easy to see that to project a slide onto a conventional screen would produce ugly shadows as the instructor stood before it. Also the studio lighting would tend to "wash out" the image on the screen. For this rea-

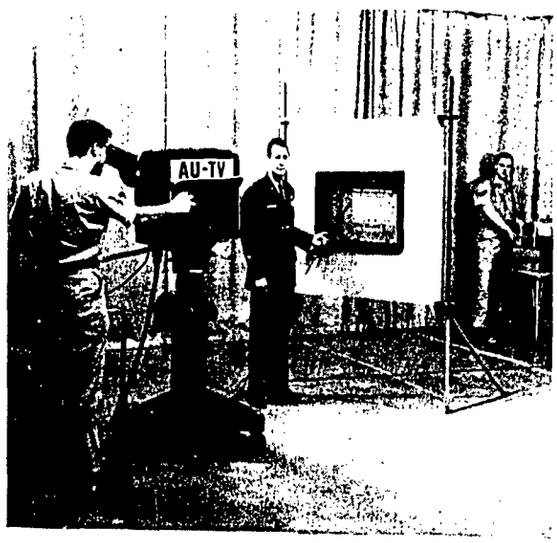


Figure 15. A rear projection in use in a studio.

son, television studios use rear projection, consisting of a translucent screen and projectors which will allow images to be reversed. The image actually comes through the screen from the rear and is seen by the camera on the reverse side. Now the instructor may stand in front of the screen without a shadow and studio lighting is no longer a drawback. Rear screens are made in a variety of sizes including large background screens which may be used for set decoration. Due to the loss of light from rear projections, slides used should be light with sharp detail and good contrast.

Another type of rear projection uses no screen. This is the transparency box by which large acetate transparencies such as used on overhead projectors are lighted from behind. The camera actually shoots the rear-lighted transparency.

Camera cards.—This means of display includes all mounted flat visuals except transparencies regardless of size. They may be set up on easels, pegboard or stuck on the wall with tape. Regardless of how they are held in place, they display pictures, charts, graphs, etc., so that the camera can frame the visual with sufficient border so that the edge of the card does not show. They may be used individually or as a series and may be placed in a stack so that each one may be removed to display the card underneath. Camera cards which are to be shown as close-ups do not create a problem of size as do those which will be displayed with the instructor in a two-shot. Photographs which are not glossy and pictures from magazines make excellent camera cards when mounted on a cardboard backing.

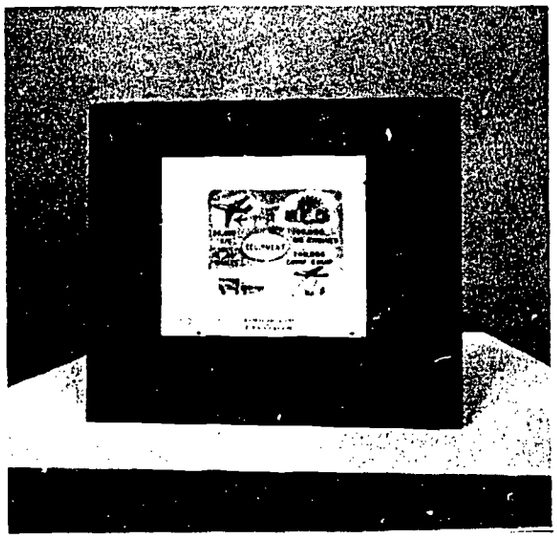


Figure 16. A typical transparency box.

Figure 17. Camera card mounted on easel.

Continuity devices.—In many instances, the instructor will want to show a series of visuals in a particular sequence and in a minimum of time. The object would be to proceed through a series of ideas rather than to dwell on any single visual. In other cases it may be that a view would be so wide or so tall as to require the camera to scan across the visual without a break in the viewer's attention. Certain devices have been developed to achieve this goal. The movie and rapid change slide projector of the film chain are the best known but there are other devices which accomplish this purpose; devices which roll up and down such as the roll board and the drum; the turntable for horizontal rotation; devices which bring flat pictures into view such as the flip down stand, turning disk, and revolving stands; and the pan-tilt device to allow the camera to pan a wide visual or tilt a high visual without losing focus.

Suspense devices.—Often an instructor will want to uncover only a part of his visual at a time or to build piece by piece a complete picture to illustrate his point. Certain devices are particularly suited to this purpose. The sliding strip or

embossograph board, and the transparency box with overlay all permit the uncovering of parts of the visual. Still another way to build up an idea and keep the viewer in suspense is with tabs held in place by magnets on metal background, sandpaper on flannel, or hooked on to pegboard, etc. Let us not forget the old reliable chalkboard for developing ideas in front of the class.

Models and mock-ups.—A model is a three-dimensional representation of an object and is best displayed placed on the floor or on a demonstration table in its normal recognizable position. The turntable is a good device for displaying models.

A mock-up is usually an object which has been rearranged from its normal appearance to enable its functions to be better seen. Such a rearrangement may also include cut-away parts so that interiors of objects may be seen as well as the exteriors. Since the television camera will probably follow the process being described and take close-up shots of the parts, this type of visual is best displayed mounted vertically.

Audio devices.—Most of the recording devices for sound are operated from the audio-console of a television control room. The tape recorder, phonograph turntable, and sound from movie film provide inputs into the sound system which can be blended and superimposed to achieve the desired effect. Devices operated in the studio require special pickup to put the sound into the system. The microphones in the studio may be used to pick up sounds of equipment being operated, etc., for added realism.

Figure 18. The instructor shows all sides of his aid by using a turntable.

30. Principles of TV Aids

In many respects, aids prepared for use on television require more rigid standards of preparation than do aids used in the conventional classroom or auditorium. A knowledge and appreciation of the peculiarities of television visual aids is an essential part of the instructor's training.

Aspect ratio.—The relationship of height to width which approximates the proportion of the TV monitor is the aspect ratio. In TV, the ratio is 3 x 4 (three units high by four units wide) and includes all elements of a TV visual presentation such as the camera view finder, studio and control room monitors, and classroom monitors. All visuals constructed for television should have the 3 x 4 aspect ratio to insure that all of the necessary visual material is seen on the monitor. Figure 19 shows a visual aid with the wrong aspect ratio. Notice that in order to show the aid from top to bottom, there is blank space on each side. To frame the aid from side to side cuts material at the top and bottom. Figure 20 shows the same aid revised to the proper 3 x 4 aspect ratio. Notice that the entire aid is on the monitor screen with no blank spaces at top, bottom or sides and no material is cut.

Edge loss and safety field.—A problem closely related to the TV aspect ratio is the edge loss and safety field. The television system tends to crop the edges of all picture material. With slides, film, and artwork prepared for opaque projection, the first cropping is done by the projector. The film pickup camera and the studio camera crop more area, and finally the classroom receiver itself makes an additional cropping. Art work material must be prepared to keep the important subject matter within a safety field so that all of it will appear on the classroom receiver. Artwork prepared for studio coverage is not as critical since the cameraman can allow for an additional safety margin.

The one-sixth rule for determining the safe area is useful and easy to understand. Divide the camera field, which is the total area of the picture, into six equal subdivisions vertically and

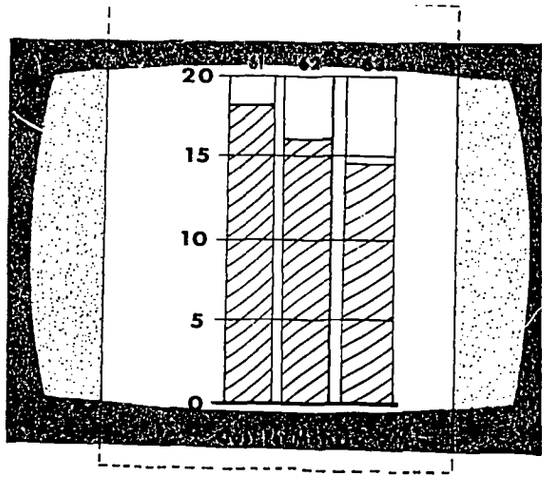


Figure 19. Wrong aspect ratio.

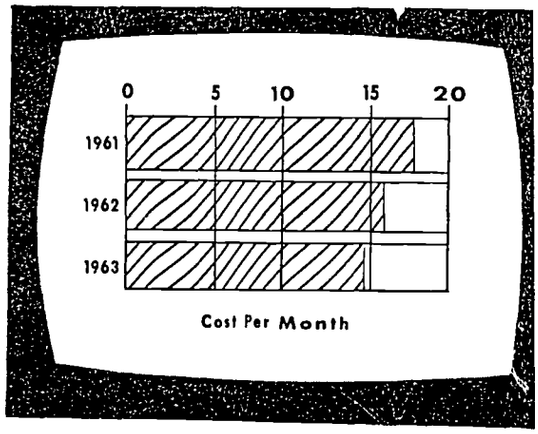


Figure 20. Corrected aspect ratio.

horizontally and the area covered by the sixteen central rectangles will be the safe area (Figure 21). A mask, corresponding to the overall size of the visual with the safe area cut out, is useful in making visual aids. Just place the mask, which can be made from paper or cardboard, on the card you plan to use to make your visual, and print or draw in the cut-out area.

Lettering.—Lettering techniques may range from rough hand lettering to machine printed professional lettering. Any type of lettering device is satisfactory, such as a speedball pen, brush, Leroy, rubber stamp, stick on letters, etc. The important consideration in lettering is legibility. A good standard of legibility is 35 characters (including spaces) per line.

Lettering size is controlled by the amount of lettering required for a given piece of artwork. The minimum height of lettering should be 1/75th of the height of the aid to be seen on the monitor. Leave space between letters proportionate to their height and width. Letters with adjacent vertical sides should be spaced farther apart than letters with one vertical and one curved adjacent side. Letters with two curved adjacent sides should be closest together; however, there is an exception to this rule. An "L" followed by a "T" should be closer together than two curved letters. Slanting vertical letters should overlap (Figure 23).

Words should not be hyphenated at the end of a line. If there is not enough room to complete the word, write the entire word on the next line. Begin and end all sentences on the same card. If there isn't enough room, begin the sentence on the next card.

Size.—The size of cards, posters, signs, and other graphics will depend upon the way in which the aid will be used. If the cards are to be handled by the instructor, they should be small enough to handle easily. Most instructors prefer hand held cards or flip cards to be made on 11" x 14" stiff artboard. Cards that are to be mounted on an easel or other mounting devices should be larger, usually 30" x 40" cards made of TV artboard are preferred. Graphics intended to be reduced to slide form should be made on 11" x 14" cards.

Whenever possible, all finished artwork for a given presentation should be of the same size. This provides two advantages:

1. A camera can cover an entire sequence of cards without being moved or focused, and

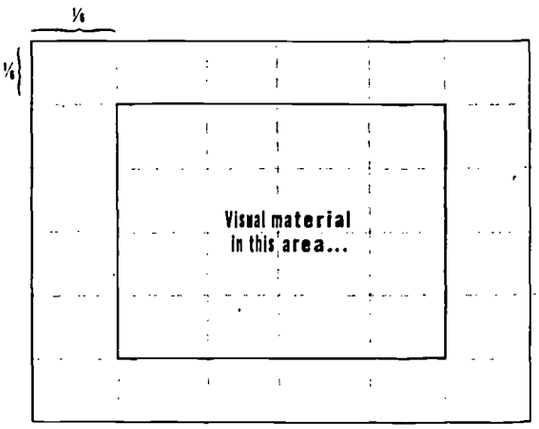


Figure 21. Applying the one-sixth rule.

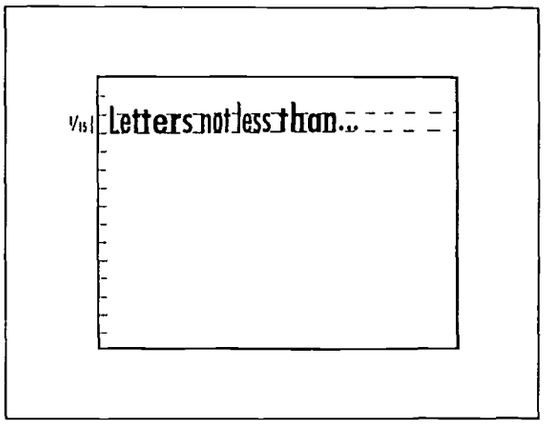


Figure 22. Minimum lettering height.

2. Artwork of the same size is easier to handle.

The gray scale.—All colors are seen in shades of gray on black and white television. The gray scale distinguishes a number of steps from black to white. The human eye can distinguish a gray scale of twenty steps; however, the television camera distinguishes an average of eight to twelve steps. This range in tonality is called the gray scale (Figure 24). Two or more different colors may appear on television as the same shade of gray, therefore, there will be little or no contrast when these colors are adjacent. For example, red chalk on a blackboard may not be discernible on television. If you are in doubt about color contrast, check the colors out on camera before you prepare the aid.

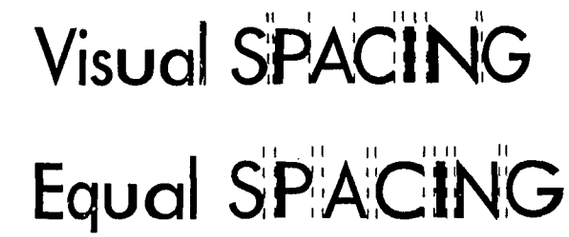


Figure 23. Proper spacing of letters.

In the gray scale, the two extremes of black and white should not be used adjacent to each other. Yellow letters on a black card are better than white letters on a black card. The important thing to remember is that there should be sufficient contrast between the letter and the background. Too much contrast can cause halo and horizontal streaking while too little contrast results in a flat, poorly defined picture.

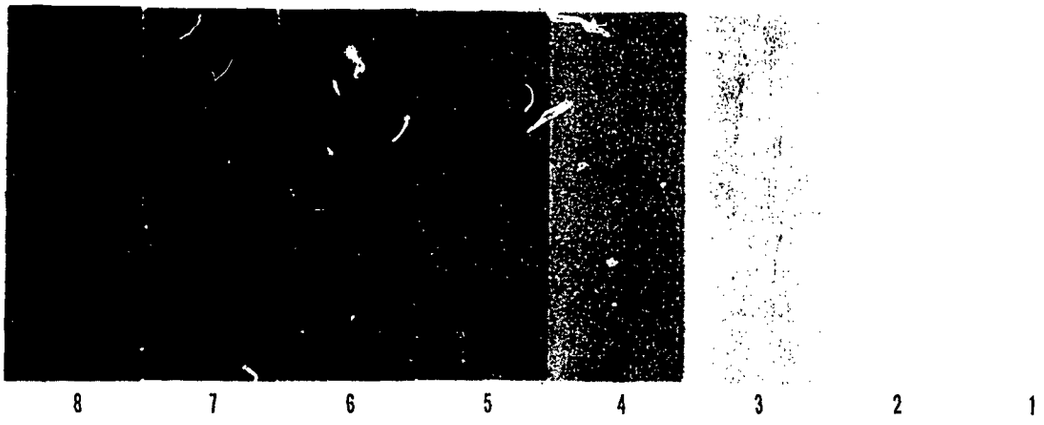


Figure 24. The gray scale.

Review Questions

1. What is the aspect ratio and why is it important?
2. What is the 1/6 rule and why is it important?
3. What is the formula for determining the height of lettering?
4. What determines the size of graphic aids?
5. What is the gray scale?

CHAPTER 7

Making Your Own Visual Aids

THERE ARE many visual aids that can be prepared for television use and many others that can be adapted. The only limitations for making aids for television are the principles of construction and the instructor's ingenuity. This chapter covers a sampling of the wide variety of aids which the instructor can easily and economically prepare with a minimum of facilities and material. However, if professional assistance and lead time is available, take advantage of it.

31. Quick Lettering

Freehand.—The freehand method of lettering is, of course, the quickest and most economical for the instructor, and the materials discussed here are usually readily available.

Felt tip pen.—This pen is available in many different sizes and colors. The felt tip pen or marking pen contains ink which soaks into the felt tip. Some types of pens have a metal cap which is unscrewed to refill the pen, however, these tend to leak under hot lights. The glass bottle type is much preferred over the metal cylinder type for two reasons: the glass bottle does not leak ink, and the felt tip is cut for more than one width. For very wide lettering use the broad side of the tip, for medium size lettering use the narrow side, and for fine lettering use the sharp edge. Black, red, or purple is recommended when using these marking pens since the colors are reproduced into dark shades of gray by the TV camera.

Grease pencil (China marker)—A grease pencil, or China marker, can be used for quick lettering. The grease pencil will write on most types of paper and on clear glass slides. Lettering done with a grease pencil is not as clean and professional looking as lettering done with the felt tip marking pen.

Chalk.—Chalk can be used as effectively on TV as in the classroom. Material can be prepared on the chalkboard prior to the telecast and revealed by the camera at the opportune time or material can be developed on camera. Some things to remember when lettering with chalk are:

a. Use soft chalk so that it won't squeak.

b. Do not use colored chalk unless you know the gray scale values. Use yellow chalk on a black chalkboard and yellow or white chalk on a green chalkboard.

c. Print, using bold strokes.

d. Follow the height of lettering rule (minimum height of letters $\frac{1}{15}$ height of aid) and remember that the camera can frame any portion of the board so know what portion of the board will be seen on the monitor when determining the height of lettering—if the aid is to be read in a two-shot, the letters must be larger since the student will see the board from a greater distance than when the aid is used in a close-up.

e. Be careful with the dotting of "i's," the crossing of "t's," and punctuation marks when you're writing on camera as the resulting noise can sound like pistol shots.

Lettering devices.—There are many devices on the market which are easy and simple to use, and result in more "tailored" and uniform lettering than the freehand manner.

The menu board.—This quick lettering device has been used for many years by restaurants and mess halls. It consists of a slotted felt board and a variety of tabbed, plastic letters. The tabs on the letters are inserted into the slots and lettering is quick and simple. The menu board is an economical device for lettering lesson titles, unit num-

bers, instructors' names, etc. The letters can be used over and over on the same board. No artwork is necessary.

Stick letters.—These letters are available in various sizes and colors. Select the letter height that best corresponds to the 1/15 letter to aid ratio. Either yellow or white colors are preferred. The letters are made of paper with an adhering substance on the plain side. Wet the plain side of the letters and place them on artboard or stiff paper to make your charts and posters. Stick letters can be used for name plates, charts, posters and many other visual aids.

Prestype letters.—These letters are attached to a transfer sheet. To transfer a letter from the transfer sheet to an aid, place the transfer sheet over the artwork, align the desired letter vertically and horizontally. Rub the transfer sheet firmly with a fingernail or a hard smooth, controllable object, taking care not to overrun adjacent letters which can be unintentionally transferred to the artwork. Prestype letters are available in a variety of sizes and colors. Select your letters according to the height by aid ratio and contrast with the background.

Rubber stamp.—This method of quick lettering involves rubber blocks with raised letters and an ink pad. Select the letter you want, stamp it on the ink pad and press the block on your artwork. Sometimes the ink won't transfer completely. When this occurs, complete the letter using a marking pen or a grease pencil.

32. Preparing Slides

Now for some general rules that apply to the preparation of all types of slides. If your slide is to be truly effective it must be visually fluent. It must convey your ideas clearly and simply. Simplicity should be your watchword in making slides.

Restrict your slides to one idea; avoid clutter; don't try to put too much on one slide for it will only tend to confuse your viewers. Make sure that the artwork is functional and not ornate. Remember, the purpose of a slide is to inform and not to dazzle or impress your audience.

Don't attack the task of preparing slides in a helter-skelter fashion. Plan for the job. Do your layout on a piece of paper first; this will save you time and material. Check it for balance, clarity and simplicity. Ask yourself: Will it achieve my objective?

Remember when a slide is used with the multiplexer system, the film pickup camera is stationary and cannot be moved for framing. Use the rule of six when determining the safe area of your slide. The same rule for height of lettering (minimum height of letters 1/15 the height of the aid) also applies to slides.

Types of slides.—Some of the many types of slides, the materials used, and the methods of preparing them are discussed briefly in the following paragraphs.

Clear glass slides.—Glass slides, usually 3¼" x 4" in size, are very useful for rear screen projection in the studio and for projection through the multiplexer unit if it is equipped with the proper projector.

The following procedure is recommended for preparing a clear glass slide. First, determine exactly what you want on the slide. Gather all the materials you will need. Then work out your design or lettering on a piece of paper. Your art work can be freehand drawing, however, in many cases you can copy a picture from a book or magazine by using tracing paper. You can use a Leroy printing set to do any lettering you may need. In any case, make sure that the dimensions of your basic layout will fit the glass slide. Your next step is to tape the slide to the paper and trace your design or lettering onto the glass. The specific type of writing implement that you may use for the tracing job will vary with the type of slide being made.

Enamel spray slides.—Only India and transparent colored inks may be used. Line definition is excellent and it is an easy slide to prepare. This slide is made ready for use by spraying a light film of clear enamel on the glass. Make sure that the coating of enamel is light and even or there may be distortion when the slide is projected. The enamel comes packaged in an aerosol type container and can be obtained through normal supply channels or purchased locally at almost any paint store. Print or draw desired information on the glass and your slide is ready to use.

Etched glass slides.—Etched glass slides are also known as frosted glass slides. The glass is treated with acid which gives it a milky color. In addition, the surface of the glass becomes somewhat roughened which permits a wide latitude in the choice of drawing implements. You can use lead pencils, colored inks and Lumuchrome colored pencils on these slides. Particular care should be given to the tracing of your design when using

etched glass. Erasures and corrections should be avoided because they will show up as smudges when projected. When you have finished your slide apply a light coat of plastic spray to it. This will prevent smudging. In addition, the slide will become clear and the milky color (frosted effect) will be removed resulting in better projection qualities for your slide.

Sandwich slides.—As the name implies, this type of slide is a sandwich, consisting of two pieces of glass with some kind of transparent material between them. Generally, this material is cellophane but any transparent material can be used such as acetate, Ozalid foil, or positive film.

Cut your cellophane to fit the glass—3¼" x 4". Now you can type or draw on the cellophane but in either, you must use a carbon sheet with it. When typing, fold a piece of carbon paper and place the cellophane inside. Insert the material in the typewriter and set the machine for stencil work. Type through the carbon, and this will produce lettering on both sides of the cellophane resulting in a better projected image. Remove the cellophane from the typewriter and bind between two pieces of glass. To bind the slide, you place the cellophane between two pieces of glass making sure that the "message" is properly centered. Then unroll about 16 inches of scotch tape, and starting at the point fartherest from the roll, place the edge of your sandwich in the center of the tape. Press the overlapping tape down onto the sides of the glass. Then roll the slide on its corners, along the tape, and press down the overlapping tape once again. Complete the process until four sides of the slide are taped. Cut the tape and press the remaining tape into place. If Polaroid frames are available, they are easier and faster to mount, more economical, and may be used over and over. However, for permanent slides, glass mounting is better since Polaroid frames provide no protection.

Photographic slides.—Photographic slides are the most widely used type of glass slides. There are several good reasons for this popularity. They can be made in any size to fit all projectors. They provide excellent definition of detail. You don't have to worry about smudging the picture as you do with enamel spray slides. Photographic slides can be described as the "pro" in the glass slide field.

Whenever you want to use photographic slides to support a lesson, make sure you plan well in advance. It often takes considerable time to get your slides back from the photo lab. The period involved will usually vary according to your priority and the workload of the lab.

Clear acetate slides.—This is the simplest form of the acetate family to use. It is a clear, transparent piece of plastic. You can write on it with a grease pencil, India ink, or magic marker. Grease pencil, regardless of color, shows black on your projected image because it is opaque.

One advantage of the clear acetate slide is that it provides a measure of flexibility to the instructor that he does not enjoy from the more sophisticated slides. For example, if you were to get an idea for a slide just before you were to give a talk, you could quickly make one using grease pencil. As a matter of fact, you could make the slide right on camera and explain your idea as you draw it. If you were using photographic slides, this ability to adjust and adapt would not be possible.

You should not infer from these remarks that all clear acetate slides must be crude of necessity. Actually, through careful planning and preparation, you can make excellent slides using clear acetate. You should, of course, follow the same procedures we outlined concerning glass slides. Plan your layout, put it on a piece of paper, and then trace it on the acetate. Since the acetate is transparent you can also trace pictures directly from books and magazines.

You can also type on the clear acetate slide. This is of particular value if your slide contains a considerable amount of lettering. Make a sandwich with a piece of carbon paper and your acetate. The carbon side of the paper should be facing the acetate. Place the sandwich in a typewriter and type directly on the carbon paper. The carbon will stick to the acetate resulting in a neat slide ready for projection. Only pencil or ditto carbon will work.

When making slides, make sure you keep the acetate clean. If oil from your hands or any kind of grease gets on the acetate, the grease pencil will skip when you write. Inks will not stick to the acetate if it is greasy. You can remove the oil and grease with lighter fluid or other cleaning fluid. If you make mistakes while preparing the slide, you can make erasures with a cloth. Grease pencil and ink will rub off quite easily.

Hand made slides of grease pencil and ink are only semipermanent. If they are to be used re-

peatedly, you should protect them by placing another clear piece of acetate on top of your slide. Tape it firmly in place and you will then have a permanent slide.

Acetate slides cannot be used with the multiplexer, nor can a vugraph machine be used because of studio lighting. Many studios have a special device called a light box or transparency box for using acetate slides. (See Chapter 6, "Instructional Aids for Television.")

Carbon slides.—A carbon slide consists of a light sheet of acetate coated with a black carbon backing. It is a commercially prepared product to be used with the overhead projector. It provides the same flexibility to an instructor as the clear acetate slide. You can use it to prepare slides just prior to or during a class. You can type or use an ordinary lead pencil to write on the carbon slide. The projected image appears as a white line on a black ground. This occurs because the carbon is scraped away from the acetate as you write. The result is a very vivid and dramatic effect. The comments we made regarding the layout and design of clear acetate slides also apply to carbon slides. Carbon slides work very well with rear screen projection.

Etched acetate slides.—Etched acetate slides possess all the properties of etched glass slides. Please refer to the section on etched glass slides for details on how to work with etched acetate. The difference is that you may type on frosted acetate.

Diazochrome slides.—The diazochrome process is a method of reproducing copy material on acetate foil. To make a slide using this process you must first put your basic drawing on translucent paper (paper such as onionskin or tracing paper). Drawings should be prepared with black drawing ink or a dark, soft pencil. You may also type on the paper. Whenever you type or use a pencil, place a piece of carbon paper under the tracing paper, so that the letters or lines will register on the reverse side of your paper. This will make the letters or lines more opaque, resulting in a stronger image on your finished transparency.

Since the size of your basic art work is quite large it is easier to work with than small slide drawings. You have a wider choice of pictures to copy. You can get more detail on the slide. You can work with bolder strokes. Another advantage is that you can literally cut out mistakes. If you are doing some lettering and make a mistake, you can simply cut out the offending part and tape a new section in place. Take care to insure that the new section is properly aligned and centered.

After your basic art work or "master" is finished, your job is practically done. You merely have to place your master on top of a piece of sensitized foil, used by Graphics, Base Installations Office, or Weather, and place it in the dry developer machine. The machine exposes the "master" and foil to ultra-violet light and then bathes the foil in ammonia fumes. The result is a clear, sharp, colored slide. The developing process is all done automatically. The same effect can be achieved with a sunlamp, and an ammonia vapor bath using a gallon jar with a grid to keep foil from contact with ammonia. A sponge in the bottom of the jar saturated with ammonia will suffice.

There will be many occasions when you will want to show your audience only one part of a slide at a time. This is particularly true if you are explaining complicated equipment or procedures. You can break down the components of an entire system so that the information can be given in small bite-sizes if you use the overlay technique. Process each overlay sheet separately. Starting with the basic overlay, tape the next overlay to the first so that they will be hinged to fold one on top of the other. Then tape the next overlay to the first two, in the same manner. Continue the process until all the overlays are in place. You can hinge all the overlays from the same side, or from two sides, and alternate placing the overlays on the stack, or from all four sides and alternate stacking. Hinging from just one side is as effective as any method and much the easiest to use.

In order to keep your "Diazo" slides from warping, you should mount them in frames. Commercially prepared frames are available or you can make them very easily. Manila folders or heavier cardboard can be used. Since your transparencies will be on 8″ x 10″ foil, you should cut a 7¼″ x 9¼″ opening in the cardboard. This will permit the foil to extend beyond the edges of the frame opening. Then use masking tape to tape the foil to the frame. Do not use staples. They can cause damage to the slides during handling and filing. Trim the frame so the slides will fit in a standard filing cabinet but

leave at least a 1″ margin all the way around the slide to provide the desired rigidity.

Polaroid slides.—Polaroid slides are photographic slides. They are discussed separately in this chapter because, unlike other photographic slides, you can do the processing job yourself quite easily. It would be fruitless for us to cover all the details in the processing of the slides since this is covered very well in the instruction book that accompanies each camera. A few comments about Polaroid slides in general are in order, however. The biggest advantage of Polaroid slides is the speed with which they can be made. A high quality photographic slide can be turned out in less than 5 minutes.

Polaroid slides are processed in the same manner as the regular Polaroid pictures, with which most of us are familiar. The slides come in two sizes, 2″ x 2″ and 3¼″ x 4″. You can make as many copies of the same slide as you desire. Each copy takes only a few minutes to make.

Polaroid slides can be mounted either in a celluloid frame or as a glass sandwich. The celluloid frame is inexpensive and very easy to use. You merely snap the frame together encompassing the slide. If you are going to use the slide repeatedly, it would be better to mount the slide between two pieces of glass. This will prevent it from being scratched or marred.

33. Still Pictures

Mounted stills.—Almost any picture which is small enough and has good contrast can be mounted on a card and shot with the TV camera or shot directly from a book or magazine. Stills can be mounted on a card by a hot-press machine, with glue, or even masking tape. There may be times when the only picture available doesn't have the 3 x 4 aspect ratio. When this occurs, use the picture and the camera operator will usually either frame inside the picture or overshoot. Stills are mounted on cards for two reasons: if the camera must overshoot, the card provides a neutral edge or background around the picture. The card, which should be stiff, makes the picture stable, keeping it from bending and falling.

Use of the opaque projector.—The advantage of using the opaque projector is that it can help you to be an artist. For example, you may have a picture in a book or magazine and you don't want to use all of the information in the picture. Place the book or magazine into the projector and project an enlarged image of it on the wall. Tape a piece of paper on the wall and trace the picture onto your paper. Mount the paper on a card and shoot it with the camera. The same technique can be used to draw on the chalkboard prior to the telecast. The opaque projector is most useful in the preparation of graphs, charts, schematics, and diagrams.

34. Tabs

Magnetic on metal.—To construct magnetic tabs (mag tabs), make your artwork on TV art board. Attach small magnets to the rear of the aid with masking tape. When the mag tab is placed on a metal-backed board, the magnets will hold it up. Through the use of mag tabs, you can use words, symbols, cutouts, etc., and take them away as you desire. Some chalkboards have metal backing which permits the combination of mag tab and chalkboard techniques. This combination can be very effective for showing diagrams, schematics etc.

Sandpaper on felt.—The construction of sandpaper tabs is the same as the construction of mag tabs except that sandpaper strips are used rather than magnets and the sandpaper tab must be mounted on a felt covered board. Sandpaper tabs can be used in much the same way as mag tabs.

Hook tabs on pegboard.—To construct the hook tab, make your artwork on a piece of TV art board. Punch two holes in the top of the card so that the distance between the holes in the card will be the same as the distance between the holes in the pegboard. Insert "S" hooks in the pegboard to correspond to the holes in the tab. When you are ready to use the tab, hang it on the "S" hooks in the pegboard.

Review Questions

1. Which type of felt tip pen is recommended for lettering?
2. What is the quickest and most economical lettering device for quick lettering?
3. How can diazachrome slides be made without the use of a machine to process the sensitized foil?
4. Why is the use of Polaroid frames not advisable if the slide is to be permanent?
5. Why should still pictures be mounted?
6. What is the advantage of using the opaque projector?

CHAPTER 8

The Instructor on Camera

AS THE planning and preparation of your presentation has progressed, you have received advice and assistance from the television staff. Now the time for the actual presentation has arrived. This time it's not a rehearsal. You can't stop the presentation and start again from the beginning. This chapter, then, is devoted to those areas of television instructing which most directly affect you as you teach before the camera.

35. Camera Presence

While television magnifies the positive qualities of an instructor, it also emphasizes the negative qualities. You must retain those qualities which make you a distinct and human individual, yet rid yourself of those habits and mannerisms which may detract from your lesson. You should show a vital interest in what you are saying or doing. Fidgeting, staring around the studio and looking nervous or bored will only call to the student's attention that you are indeed disinterested, nervous or bored. The movements and actions of the studio crew should be ignored, with the exception of the floor director. If you watch something off the set, you know what you are seeing but the student does not. This becomes distracting to him because he wants to see what you are seeing. If you are speaking with another instructor on camera, look at him when you speak; however, any remarks intended for the student should be addressed to the camera. When two or more cameras are used, you should know which camera is on-the-air so that you will address the right camera and thus remain in direct contact with the student.

Motion helps to maintain student interest. In order to achieve smooth camera movements, sitting, standing, pointing and other movements should be performed slowly and deliberately. Sit or stand in a natural and comfortable position and be natural in your expressions and gestures.

Be watchful for any mannerisms which, when magnified by television, may become distracting. The most obvious of these are tie fixing, finger drumming, swaying or rocking on the heels, slumping and scratching. There are, of course, countless other little gestures, movements, and actions which we all employ in a tense situation.

Delivery.—The natural personality of the instructor is projected by the television camera. Be natural, not perfect. Be spontaneous and try to avoid giving the student the impression that he is hearing a "canned" lecture. Varying the pace of delivery avoids monotonous voice patterns and helps to sustain student attention. A pause from time to time for emphasis can be most effective.

You communicate directly with each individual student through the camera. It is not necessary to project your voice as you might in an auditorium or lecture hall. Try to achieve a confidential and intimate quality in your delivery. Your speech can be effective with very little force or push. The best way to achieve this intimate quality is to address your remarks directly to the camera operator. Psychologically and technically, this will be a great help in building an easy, conversational style.

It is natural to experience tenseness before going on-the-air. Those who are so impassive that being on camera stirs no emotion in them are often lifeless in performance. Excitement, when controlled, is a desirable aid toward a dynamic presentation. Since no one is perfect, some errors are to be expected. Correct your errors in a natural way without calling undue attention to them.

Allow ample time to cover each point you want to make, and remember to keep your ideas simple

and direct. Your students, in most cases cannot ask you to slow down, repeat a statement, or to clarify a vague point. Remember that television is an excellent medium for illustrating your ideas. You should *show* rather than simply *tell*.

Personal appearance.—The personal appearance of the television instructor—dress, accessories, and makeup—are of major importance.

Dress.—Military instructors should wear the proper uniform. Most Air Force insignia does not present a glare problem since it is not highly polished. Army brass is highly reflective, however, it can be sprayed with a dulling spray which can be easily wiped off after the telecast. Lieutenant's and captain's bars are highly reflective and usually must be sprayed (Figure 25). Eagles and stars may also present a problem in this area but not quite as much as bars.

Civilian instructors should wear neat, well pressed business suits unless conditions will not permit them. The real determinant of what color is suitable for black-and-white television wear is the glare effect when too much contrast is present. Extremes between black and white cause problems in shading the picture. The deeper the contrast, as between a black suit and a starched white shirt, the more difficult clear rendition becomes. Pastel blue, gray, or tan shirts are preferred to white, which is reflective, and may wash out facial features (Figure 26). Clothing that is distinctly seasonal and will "date" a video-taped program should be avoided.

Accessories.—Accessories should be kept to a minimum. Metal cuff links, tie clips and similar items should be avoided. Some name tags are highly reflective and should be either sprayed with dulling spray or removed if permitted. Neckties should be conservative, in contrasting colors with small stripes or patterns, or in solid shades. Eyeglasses may be worn if they are necessary.

Figure 25. Shiny insignia causes glare.

Figure 26. Reflection from white shirt washes out features.

Women instructors will have the same contrast problems as the men so they should avoid extremes. Dark blue will give the same slimming effect as black on television, but without the contrast problem. Horizontal stripes should be avoided even if the instructor is slim enough to wear them in the classroom. Horizontal stripes will tend to make the slim look heavy and the heavy look preposterous. Horizontal stripes also create a technical problem called streaking. Vertical stripes will have the same effect as in ordinary wear, provided they are not too contrasting. Avoid shiny jewelry such as bracelets, earrings, pins, etc.

Makeup for television.—Normally, no special makeup is used on men. Men should be clean shaven and may use a little neutral powder to tone down beard shadow, pale complexion or facial glare. TV Pan Stik makeup is used extensively in television. When applying Pan Stik, apply several light strokes to the face and forehead. Use the fingers or a damp sponge to blend it until it covers the entire face and neck. For dark beards, apply a thin film of Pan Stik into the beard area, under the jaw, and over the neck to the collar

line. If TV Pan Stik is not available, pancake makeup or even leg makeup may be used. Women instructors should wear normal street makeup with a medium shade of lipstick and nail polish.

36. Working With Visual Aids

Since the selecting, constructing and displaying of visual aids has been discussed in Chapter 6, "Instructional Aids for Television," it is appropriate to provide you with information as to what you should and should not do with visual aids before the television camera. The following then, is a list of things for you to keep in mind and put into practice each time you work with visual aids on television:

- Visuals mounted on display devices:

(1) Stay close to the aid in a two shot since distance is exaggerated by television.

(2) Move away from the aid when you are through with it, move to it when you are ready for it.

(3) Don't block the aid with your body.

(4) If you change your own cards on the easel, slide the front card off to the side, revealing the next card.

- Hand-held visuals:

(1) Hold the visual steady. A piece of masking tape on the table is useful in marking the position and preventing slipping when you rest the visual on the table.

(2) Be sure that the student gets a good look at the visual.

(3) Tilt as necessary to eliminate glare.

(4) Keep fingers or thumb out of the picture.

- Objects:

(1) Support objects on a table or when holding objects, support the hands on the table (Figure 27).

(2) If an object is in closeup, be careful of moving it or picking it up since a small movement can take the object out of the picture.

(3) Turn objects to the closeup camera if a closeup shot is planned.

(4) Show only one item at a time unless you are comparing one object with another.

(5) To change objects on a closeup, move the new item in front of the old, then remove the old object.

(6) Don't ignore obvious accidents. Explain what happened and go on with your teaching.

- Use of the pointer:

(1) Use the pointer only when necessary to call attention.

(2) Hold the pointer steady on the visual.

(3) When moving the pointer from one point to another, for example, on a map, move it slowly.

(4) Remove the pointer from the visual when the pointer is no longer needed.

(5) Most studios have pointers in a variety of sizes. Use the pointer that best suits your need.

- Making your visual aid on camera:

(1) Print your material unless you write exceptionally well.

(2) Keep your written material in the three-by-four aspect ratio. Keeping the length of the lines short will help.

(3) Keep writing or illustrations close together. Don't write or draw all over the board.

(4) Again, don't block the visual.

(5) When using the chalkboard, use a soft chalk and print heavy.

37. Use of Microphones

Some people become so engrossed with the visual impact imparted by television that they tend to forget that television is also a medium of sound. The microphone is important in that it is the instrument which links the instructor's voice with the student's ear. It should convey to the student only what is intended for him to hear.

The microphone check.—When using any type of microphone, it is important to check the mike prior to air time. When the audio engineer re-

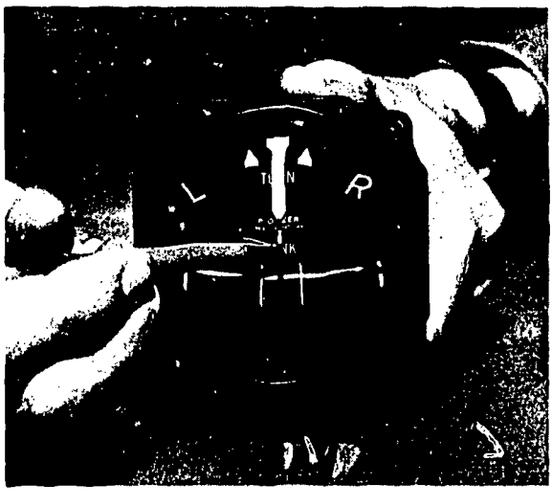


Figure 27. Hands rested on table keep objects steady.

quests a mike check, he wants to know if the microphone is working; also, he wants to know what your voice level will be so that he can set this level and keep it the same throughout the presentation. The recommended method for giving a mike check is to read or recite a few sentences of your presentation in your normal voice. Never whistle or blow into a microphone for a mike check and, as they are delicate instruments, never thump or rap on them. Counting from one to ten is not desired as a mike check because it doesn't tell the audio engineer what he wants to know. When you go on-the-air, speak with the same volume you spoke with when you gave the mike check.

The lavalier.—The lavalier can be worn over or under the necktie, however, it should be adjusted so that it is neither too close to the chin nor too deep in the coat. Highly starched shirts should be avoided if the mike is worn under the tie. The mike rubbing against a starched shirt causes an irritating, scratching sound.

The microphone cord should be tucked in the belt or pinned to the waist of the female instructor so that it will trail from the back rather than from the front. The coat should then be buttoned with the mike cord inside. Limit your movements about the set to the length of the mike cord.

The table microphone.—This microphone is most frequently used for panel type presentations. Once a mike level has been set, don't change the location of the microphone. The audio level of this type microphone is more critical than other mikes since it is multi-directional and an audio level is normally set by the audio engineer prior to the presentation. It has been placed by the audio engineer for the best pickup. Table microphones are sensitive instruments so avoid extraneous sound such as pencil tapping, paper rustling, kicking the table or hitting the mike. Small sounds are amplified and are irritating to the student.

Try to keep the same relative distance and angle from the microphone throughout the presentation. Don't lean toward the mike in order to be heard. This increases the volume of your voice, may cause distortion, and looks bad on camera.

The boom microphone.—This mike (Figure 28) is usually suspended one foot above and one foot in front of the instructor and the boom operator can rotate the mike so that the live side of the mike is always facing the instructor. It isn't necessary to look at the mike when speaking so don't be giving worried glances to see if it's still there. Some important things to remember when using the boom mike are:

(1) Be careful to stay within range of the mike.

(2) Don't turn fast because fast turns involve a large amount of boom movement.

(3) When you get up, get up slowly so that the boom operator has a chance to raise the mike.

(4) Try to reduce your voice volume when speaking with someone who has a weaker voice, otherwise your voice will boom out or his voice will be barely audible.

(5) Don't talk with your back to the microphone. If you are working at a chalkboard, for example, turn around and face the camera when you wish to talk.

38. Cues and Signals

Hand signals.—Where accurate timing and continuity are to be maintained, reliable cuing systems are necessary. Naturally, the program director can't speak to the instructor while the telecast is in progress. The cues and directions are relayed by the floor director or by the camera operator when there is no floor director. Hand signals provide visual communication between the program director and the instructor. When hand signals are received, it isn't necessary to acknowledge them, just follow them. The hand

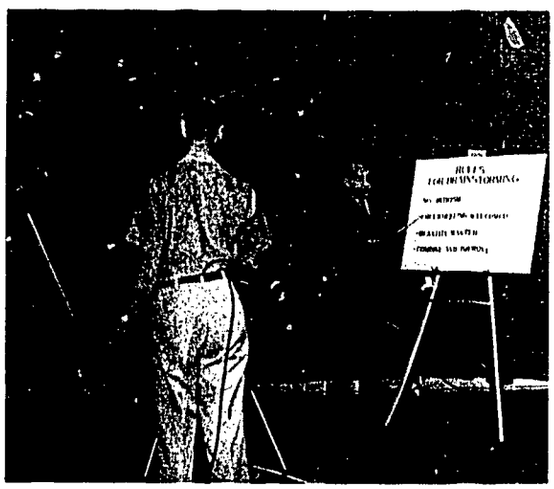


Figure 28. Instructor using boom mike.

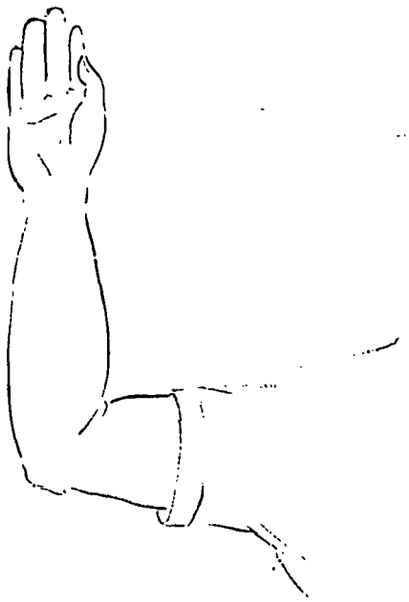


Figure 29a. Standby.—This signal means get ready to begin speech or action. When the instructor receives this signal, he should not move or speak until he receives a direct cue.

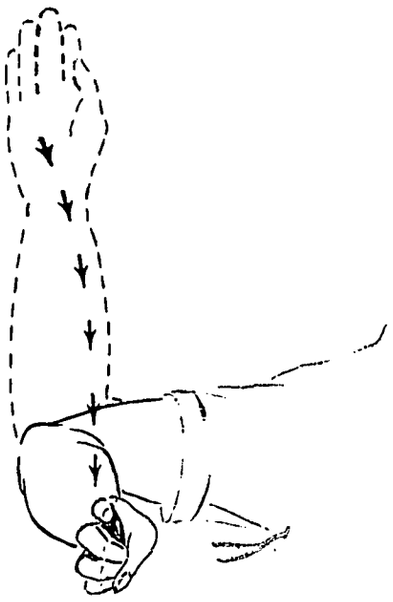


Figure 29b. Cue.—This signal is sometimes called a direct cue. The instructor receives the cue immediately following the standby. The cue initiates all on-camera speech or action.

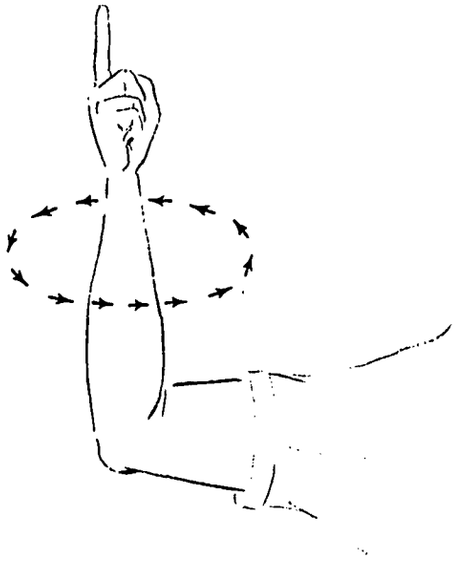


Figure 29c. Speed up.—This hand signal tells the instructor to step up his pace of delivery.

signals shown in Figures 29a–29j are rather standard, but there are many more which are not standard. Check with the floor director on his use of hand signals prior to the telecast.

The tally lights.—Located on the front of each studio camera are two red lights, one on each side of the lens turret. These red lights are called tally lights and they indicate to the instructor which camera is on-the-air. When a camera is on-the-air, its tally lights are on and when a camera is not on the air, the tally lights are off.

There are times when the tally lights on two cameras will be on at the same time, during a superimposure and at the mid-point of a slow dissolve. For this reason, it is not recommended that you begin speech or action as soon as the tally lights come on. Wait for the cue, even though the tally lights are on, unless you have been instructed otherwise by the program director.

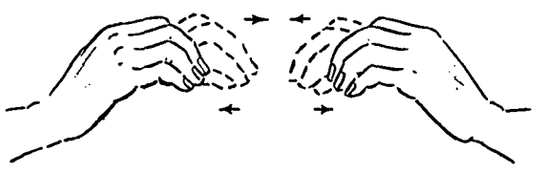


Figure 29d. Slow-down.—This is a slow-down signal to indicate to the instructor that he should slacken his pace of delivery.

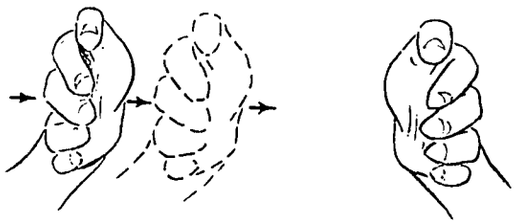


Figure 29e. Move-to-side.—This tells the instructor that he should move in the direction indicated. This hand signal may be used to move the instructor (1) nearer his aid, (2) from in front of his aid, (3) from in front of a distracting background, (4) into a better lighted area, or (5) to move two instructors closer together.

If you look up from your notes and the tally lights on your camera are not on, don't panic. Shift your eyes to the other camera, then slowly turn your head toward it. Another way of changing from one camera to another is when you see the tally lights go out on your camera, drop your eyes and look up at the other camera.

When two cameras are in use, one will usually stay with the instructor and the other will get the close-ups. When your camera is off the air and the other camera is taking a close-up, it isn't necessary to look at the camera. Unless you need to see the item that is in close-up or need to watch the monitor, continue to look at your camera so that you will be ready when your tally lights come back on.

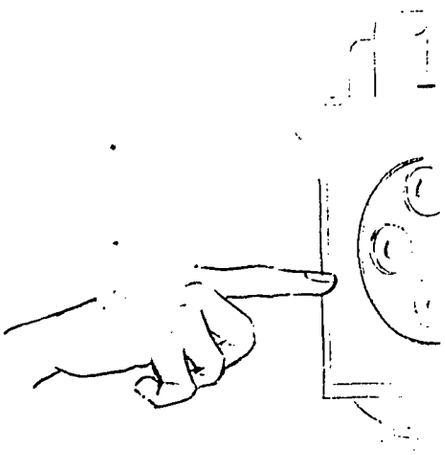


Figure 29f. Cue-to-"live"-camera.—This hand signal tells the instructor which camera is on the air. The signal is given as the switcher changes cameras. This signal may also mean, "You are looking at the wrong camera," or "Stop glancing around the studio and look at the camera."

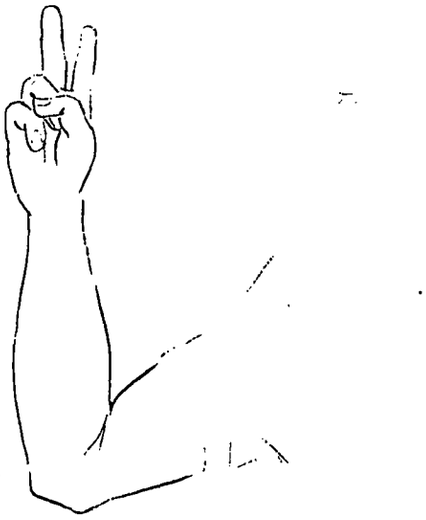


Figure 29g. Minute cue.—This and the next two time cues tell the instructor how much time remains so that he may adjust his presentation accordingly.

Watch the tally lights and use them but don't ignore the floor director. The tally lights and the floor director give you a double cuing system.

The studio monitor.—Every television studio that you may telecast from will have a monitor in the studio. The studio monitor is simply a tele-

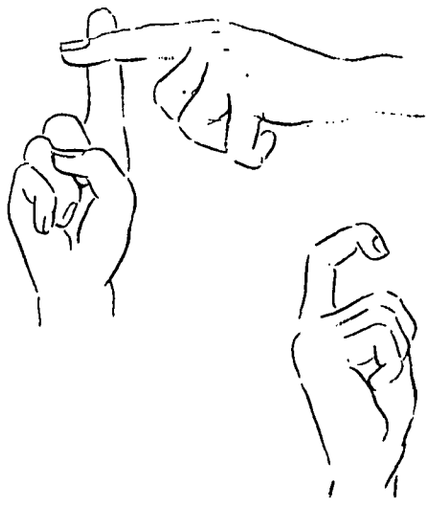


Figure 29h. The 30-Second cue.—This cue tells the instructor that he has 30 seconds of time remaining. The 30-second cue may be given in either of two ways. The crossed forefingers is the most common; however, if the cameraman is cuing, he may give the crooked forefinger cue, since one hand may be busy with the camera.

Figure 29i. The 15-second cue.—The clenched fist tells the instructor that he has only 15 seconds of time remaining and he should finish what he has to say or do.

vision set placed in the studio so that the instructor can watch the telecast. The instructor should use the monitor to read visual aids being shown through the multiplexer system, narrate over film, or to watch aids in close-up.

The monitor is not placed in the studio for the instructor to see himself. When he looks at himself in the monitor, he loses his eye contact with the student and the student will wonder what the instructor is seeing.

In addition to visual cues, the instructor may receive aural cues from the dialogue of a co-instructor, sound from recordings or film, or from the program director while a film or record sound is on the air.

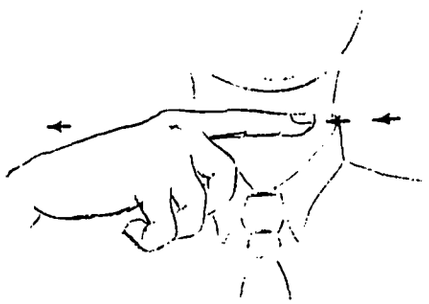


Figure 29j. Cut.—The cut signal tells the instructor to finish what he is saying or doing as soon as possible without giving the impression of haste. If the cut signal is given in the middle of a sentence, by all means he should finish the sentence and go off the air gracefully. Since split-second timing is not as important on educational TV as it is in commercial television, the cut signal is not used very often.

Cues from the instructor.—The instructor can make the program director's job easier by subtle audio cues. If you wish to tell the program director that you are going to move to another part of the set, you may say, for example, "Let's look at the map," or, "Let's go over to the demonstration table, and actually see. . . ." These cues will sound natural to the student, who is generally unaware of the reaction triggered in the control room and studio by these seemingly unimportant remarks.

Care should be exercised in cuing visual material, especially if it is unrehearsed. For example, you must be specific when you cue unrehearsed visual material. You can alert the program director to an upcoming slide by saying, "The first picture shows. . . ." Do not say, "Slide on," "Slide Off," or, "Roll the film please." Asking for visuals in this manner disrupts the continuity of the telecast and makes it seem unprepared. Try to alert the program director as subtly as possible, but not so subtly that he doesn't get the message. Alert the program director but don't try to tell him the obvious, and don't try to direct the telecast and insruct at the same time. For example, nothing is more irritating to the program director than the instructor who says, "Bring that camera over here for a closeup," or "Put the camera back on me." This type of cuing is not only irritating to the program director but also to the student.

39. Prompting Devices

While the focus of our efforts is the mind and memory of the student receiving the message, we should remember that the mind and memory of the instructor might need assistance in delivering the message.

The roll up prompter.—The most convenient and serviceable device for use in those situations where the speaker wishes to have a word-for-word account of his material before him is the electronic speech prompter. This prompter is a vertical roll device which contains the full text or cue lines and is usually mounted on the front of the camera. The device moves a paper roll past the reading point at an adjustable rate of speed (Figure 30). The instructor, a floor director, or a co-instructor can control the rate of speed of the prompter while the telecast is in progress, adjusting the speed to the instructor's own speak-

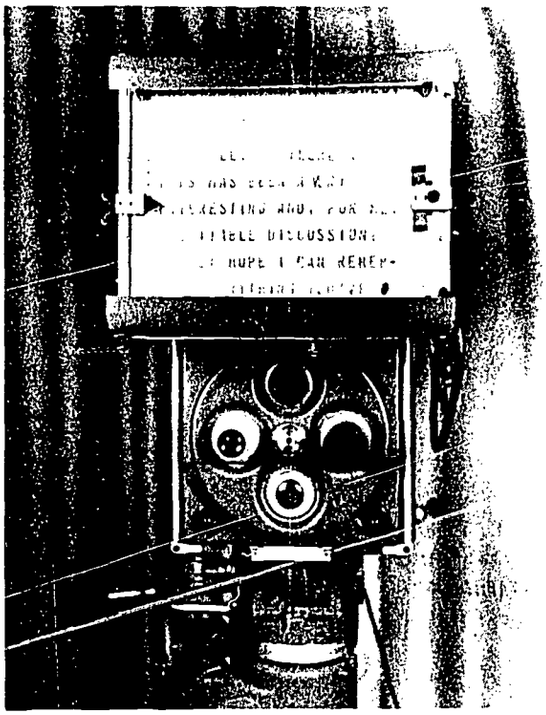


Figure 30. The vertical roll prompter.

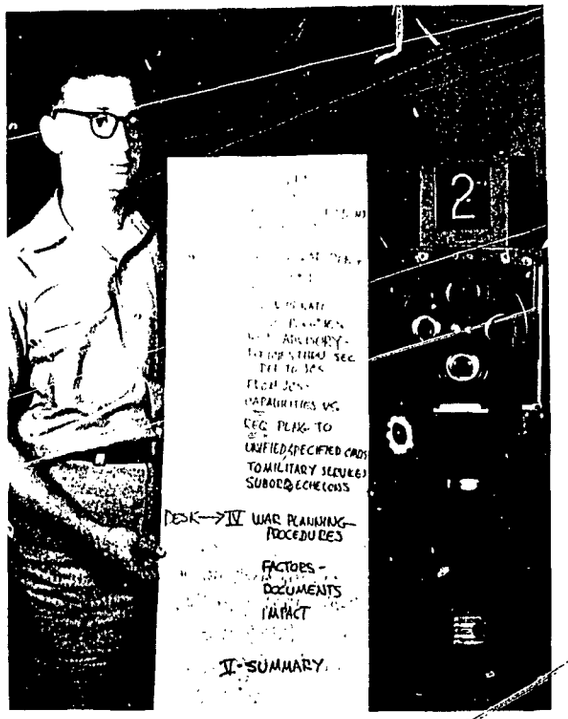


Figure 31. The hand-held cue card.

ing rate. A king size typewriter is normally used to print the copy but it is possible to print the copy with a marking pencil. The instructor may read the copy from the prompter and yet give the impression that he is looking directly into the lens.

Some studios may have a manually operated, homemade prompter, consisting of two rollers and a hand crank. The homemade devices are usually limited to an outline rather than a word-for-word text.

Cue cards.—An outline of the instructor's lesson, including cue words or phrases may be printed on cards for cuing purposes. These cards may be held by a floor man and changed as required (Figure 31). The outline can be printed on paper and attached to the camera by a piece of masking tape (Figure 32). If you use cue cards or cue sheets, don't try to put your entire word-for-word text on them but rather an outline with cue words and phrases.

Notes.—The use of outline notes on the table or desk in front of you is permissible in most cases but be careful that you do not look at them too often as a bobbing head is most distracting. Outline notes may be placed anywhere in the

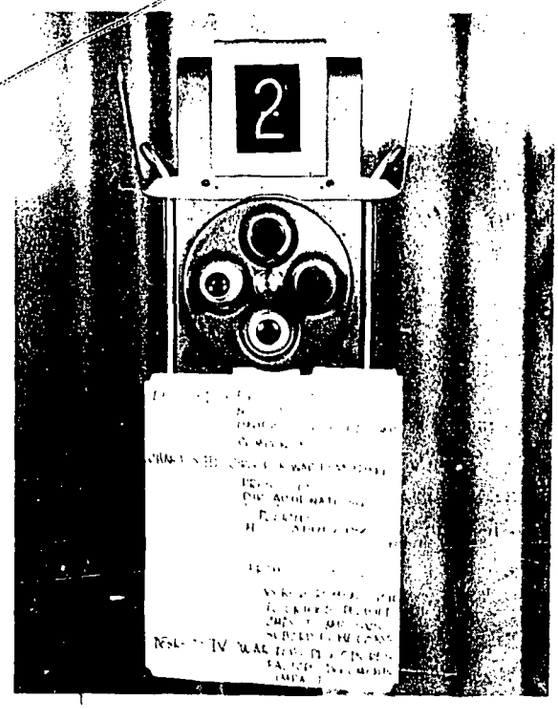


Figure 32. Cue card attached to camera.

studio, even on the floor and referred to occasionally. The important thing to remember is not to give the student the impression that you are reading your lesson.

Quotation cards.—If you wish to give a direct quotation, it is quite all right to read it. No one expects you to remember a quotation verbatim. If you have only one quotation, read it directly from the book or magazine if available. When more than one quotation is to be made, many instructors type their quotations on three by five cards. Each quotation is typed on one card and the instructor simply picks up the card and reads his quote on camera.

Review Questions

1. What is a good way to achieve an intimate quality in your delivery?
2. What is the real determinant of what color is suitable for black-and-white television wear?
3. When should you use a pointer?
4. What is the best way to give a microphone check?
5. What should you do when you are using the boom mike and your co-instructor has a weaker voice than you?
6. What should you do if you receive a cut signal?
7. What are two situations when the tally lights on both cameras will be on?
8. What is the purpose of the studio monitor?
9. Why are outline notes preferred to verbatim notes?

CHAPTER 9

Television and the Classroom Teacher

THE TWO principal ways in which instructional television can be used are: (1) as total instruction, and (2) as supplementary instruction.

In total instruction, practically all teaching is done by the television instructor. This type of television instruction is not prevalent in Air Force schools at the present time but may become more widely used in the future. It is helpful, however, in circumstances where few highly qualified instructors are available, such as teaching highly specialized subjects like foreign languages or advanced science. The classroom instructor in this situation acts as a proctor and handles routine administrative duties connected with the televised lesson.

The purpose of this chapter is to present to the classroom instructor the information which will aid in using television as supplementary instruction to his normal classroom activities.

40. Team Teaching

Most Air Force TV instruction is the supplemental type. Parts of the curriculum are presented on television and classroom instructors conduct important additional activities which contribute to the lessons. These can be in the form of discussions, laboratories, assignments, tests, etc., but the classroom instructor plays a key role in the teacher-learning situation; the classroom instructor's knowledge, skill, competence, and imagination determine to a large degree the amount of learning accomplished and the attitudes his students will possess. The studio instructor and classroom instructor in supplemental teaching must perform as a team (Figure 33).

Relationship of TV-classroom instructor team.—When Air Force instructors become involved in the use of television, they soon realize that although there are differences in procedures, the basic principles and objectives of instruction remain constant. Both the TV teacher and the classroom instructor strive to create the best teaching-learning situation, each in his own role and in partnership with each other.

The use of TV presents an excellent opportunity to exchange ideas and to become familiar with different points of view and different approaches in teaching. Both instructors have the same objective: the transfer of knowledge to their students. Instruction by television does not imply that traditional teaching techniques are obsolete, rather a combination of old and new emerges according to the needs of the students and the imagination of the teacher.

The preparation of the studio instructor for a telecast has been outlined in Chapter 5, "Preparing the Telecast." The classroom instructor likewise has certain distinct responsibilities and duties if the TV lesson is to be successful. These can be divided into three parts: before the telecast, during the telecast, and after the telecast.

Before the telecast.—The attitude of the classroom instructor is important for effective television instruction. He must realize that for effective learning to take place in his classroom he must motivate not only his students but himself. Through preparation he can build interest in the lesson which is to be telecast. He should know as much about the lesson as possible. In addition to knowing the subject matter the classroom instructor should confer with the studio teacher and familiarize himself with the proposed presentation. If at all possible he should preview the program. By doing this he will be better able to prepare the students before the telecast and add supplementary instruction after the presentation. In some schools which utilize team teaching, the

Figure 33. The teaching team in action.

studio and classroom instructors plan the lesson as a team.

The instructor must next prepare the physical facilities of his room for the reception of the televised lesson so that maximum learning can take place. If all requirements for satisfactory televising of material from the studio are met but the learning environment (student location) is not adequate, then the entire communication process breaks down. The student must be able to see and hear comfortably that which appears on the monitor. School officials and instructor personnel should be aware of the necessary receiving room requirements for proper viewing. Experiments have shown that a maximum viewing distance of 12 times the width of the television screen, or 1 foot of viewing distance per 1 inch of screen width, is approximately the extent of normal visual acuity. Furthermore, the student should not view the monitor at extreme angles from the verical plane of the picture tube, as the loss of legibility becomes pronounced. The minimum distance from which a student can comfortably view the monitor is between 6 feet and 8 feet. The actual number of students possible to be placed between the minimum and the maximum distance, and the maximum angle, depends upon the spacing between students (Figure 34).

The monitor should be placed high enough so that students can view over the heads of the students in front of them. It should be placed on the wall opposite windows in such a manner as not to reflect either artificial or natural light and, if necessary, a hood may be installed around the monitor. Usually the normal lighting in classrooms is satisfactory. A light level of not less than five (5) footcandles is recommended for viewing and note taking.

The student must be able to hear as well as see the monitor. Many sets have poor quality speaker systems, usually only four inch speakers. It is suggested that the speaker be at least six inches in size or possibly eight inches. This may mean an additional speaker box attached to the monitor or, if there is room, the installation of one within the set. In large receiving areas where students are grouped around a number of monitors, a high quality public address system may be necessary.

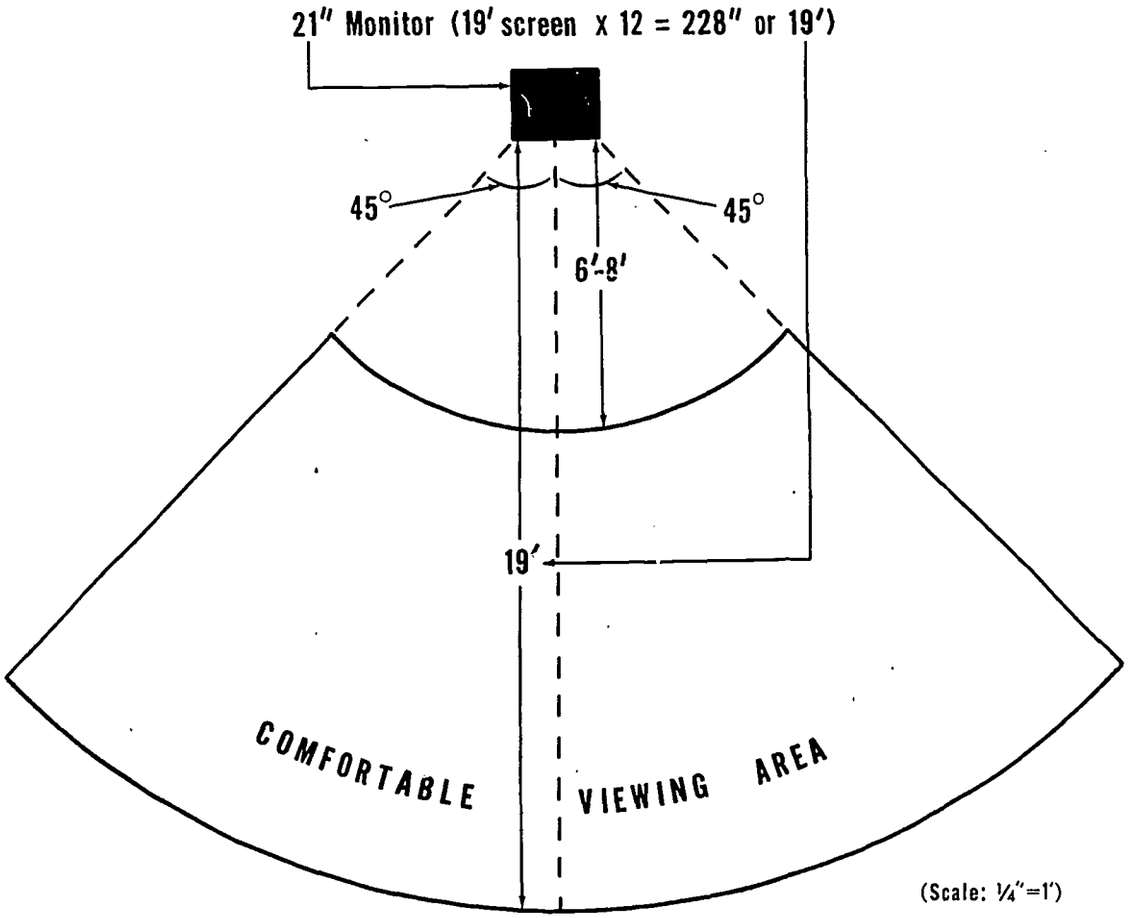


Figure 34. Recommended viewing area.

Monitors are usually placed in the corner or centered against one wall of a classroom. If a small room is set up specifically for TV, curving arcs of the seating arrangement are desirable for adequate viewing. In large viewing areas, monitors may be placed across the front and down the center and sides of the room. This is the usual arrangement, although it is somewhat uncomfortable to those students whose seats are not in line with the monitors and who must turn the head or the body for viewing. Consideration should be given to various arrangements of students and monitors to provide the best possible viewing. One arrangement is to divide the students into several segments and have them face inward to a number of sets grouped together, which have been separated by dividers for each segment of students. A circular pattern of seating may also be considered. Students in this circular pattern would face a number of sets with dividers at the axis of the circle.

Pre-class preparation also includes orienting the students to television instruction. If this is the first "telecast" then the policies and ground rules should be explained. The instructor may also need additional teaching materials such as textbooks, maps, diagrams, and audio-visual aids to reinforce the television lesson. These should all be provided for and arranged prior to the telecast.

During the telecast.—Most instructors regard student reaction or feedback as essential to effective teaching. The very nature of television instruction tends to prevent feedback, since the studio instructor is physically removed from the learner. Consequently, there is a loss of the intimate student-teacher relationship that exists in standard classrooms. Some Air Force schools have employed electronic devices that allow the

student to be in two-way communication with the studio teacher. On the other hand, the lack of interaction in classrooms can be greatly alleviated through the participation of the classroom teacher. If he anticipates questions and problems during the telecast and then conducts discussions as follow-up to the lesson, this problem of interaction can be greatly reduced.

While the telecast is in progress the classroom instructor should take notes on highlights of the lesson and encourage his students to do likewise.

An important function of the classroom instructor during the telecast is to maintain proper supervision and control of his class. The degree of control depends in large part on the maturity and motivation of his students. Less mature students may have to be reminded that the televised lesson is for learning, not entertainment.

Finally, the classroom teacher must be ready to supplement the TV lesson in case of electronic difficulties. If he has been in on the planning and rehearsals of the telecast then he will be better prepared to take over in this type situation.

After the telecast.—The activities of the classroom instructor in this phase will vary depending upon the nature of the class and the subject taught. In most circumstances, however, this is the time when the classroom teacher can strengthen the learning process. He should be familiar with the areas of instruction which need reinforcing and clarification. A good start is to pose stimulating and pertinent questions regarding the main points in the telecast. Good discussions can pinpoint the learning objectives and outcomes.

Also during this time the TV instruction should be evaluated by short tests so the instructor can determine the areas of instruction which need to be re-emphasized. He should keep in mind that effective evaluation must have a direct relationship to the purpose of the telecast.

41. Television as an Instructional Aid

Not all facilities or courses are equipped for team teaching, however, a teacher in the classroom can still use television effectively to enhance the classroom lesson. Many classrooms are equipped to receive broadcasts directly from educational or commercial television stations; others may be connected only to a closed circuit system but capable of obtaining broadcast programs from the central studio by prior arrangement. This arrangement may include tape recording the programs for playback at a later time.

With either of the above capabilities, the classroom teacher should consult the schedules of studios nearby for programs that could vitalize material which the teacher may wish to communicate to the student. While this use is not always as pertinent to the lesson as may be desired, it does broaden the base of knowledge in a subject area and gives the teacher an opportunity to illustrate many complex ideas.

The television program is used in the same manner as a film or reading assignment to illustrate material to be covered or to stimulate discussion by the students. The problems of viewing are the same as discussed above and should be just as carefully attended to as if the complete lesson was televised.

42. Television as an Instructional Device

As a minimum use of TV, the instructor who has a monitor-equipped classroom tied into the school studio may use the closed-circuit system as a means of projecting visual material to his class. Several classroom devices are on the market which permit the classroom instructor to use the amplification and attention of television to present material better than he is able to with conventional instructional devices (Figure 35).

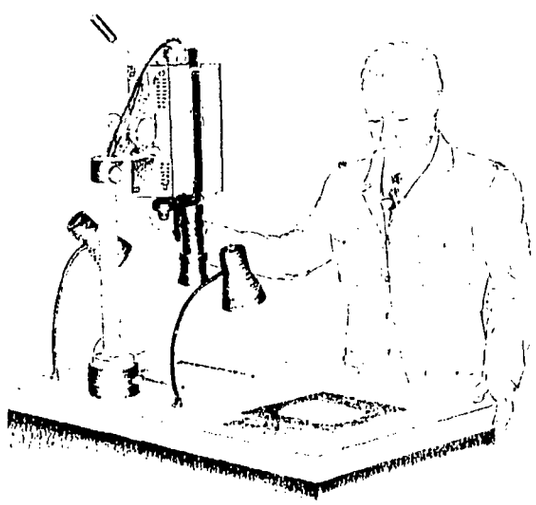


Figure 35. Instructor can use television to project his visual material.

It would be possible and desirable for films normally shown in the classrooms to be put on TV. Slides and camera cards as well could be shown to the students on the monitor rather than on a screen. Such use of the closed-circuit system would require coordination with the studio but the advantage of viewing the material in a lighted room would be worth the effort. Where the capability exists, the imagination of the instructor would be the only limiting factor.

Review Questions

1. Does the studio teacher have the same objective as the classroom teacher when working as a team?
2. In a team-taught lesson, who is responsible for motivation of the students?
3. Why should planning be accomplished jointly by the studio and classroom teachers?
4. What are some of the physical arrangements necessary in the classroom for good television viewing?

CHAPTER 10

Evaluation with Television

EVALUATION is usually needed to determine the degree to which students have achieved the objectives of instruction and instructors meet current performance standards. Television instruction has emphasized this need in two ways: first, by offering a new medium for measuring student achievement of course objectives; and second, by providing a means of evaluating teacher performance not available through any other medium.

Television has been used for instruction for more than ten years. Much instruction during this period has been experimental to explore the possibilities of the medium. Numerous studies have compared effectiveness of TV instruction and conventional classroom instruction. Few studies, however, have dealt with the best way of evaluating student learning gained through TV instruction. Even less attention has been given to the use of TV for measuring student achievement. The studies emphasize a continuing need to explore possibilities for using tests in conjunction with TV instruction. The need for improved tests and test items to measure student achievement of course objectives has been brought into sharp focus. If teacher-made tests are to be used, most teachers will have to devote more attention to test preparation. Teachers must understand and apply the principles underlying good test-item construction. They must also be alert to discovering better ways to evaluate TV instruction and be willing to experiment in finding new and more effective ways of using TV to evaluate student achievement.

43. Testing Student Achievement

Specific objectives.—Every report on TV instruction which has critically examined the tests used to evaluate either effectiveness of instruction or student achievement has emphasized that getting teachers to formulate specific objectives for a course is a major problem of TV instruction. When the desired achievement has not been specified in advance, teacher-made tests to measure student achievement serve no useful purpose. Instructors should arrive at clear, concise statements of objectives before attempting to evaluate student achievement. If televised instruction forces teachers to a clear statement of instructional objectives, television will have rendered education an important service. Not only will more exact evaluation be possible, but instruction should improve.

Better tests.—Conventional forms of paper and pencil tests to measure student achievement have been carried over bodily into TV. Teacher-made tests to evaluate student achievement should be the best possible tests that can be constructed. Experience shows that the average teacher simply uses the same tests he used when teaching by conventional means. In a majority of instances, such tests proved unreliable. A common objection to them was that they measured only factual recall material, and yet, the teacher basically was concerned with student understanding and application of important principles. Teacher-made tests should be designed to measure achievement at the level of learning specified in the objectives for the course. Standardized tests have been used to measure the effectiveness of TV teaching. When standardized tests measure course objectives at the desired level of learning, testing results have usually been valid. The teacher rarely finds a standardized test measuring his exact objectives at the appropriate level of learning and is forced to construct his own test.

Continuous evaluation.—In the face-to-face teaching situation with small classes, the teacher makes continuous evaluations of individual student progress in a variety of ways. This is not possible with televised instruction. The teacher has lost the benefits of both rapport with the class and student feedback. TV instruction thus generates a need for constant evaluation. Unless evaluation is continuous the instructor has little basis to judge student understanding and progress toward course objectives. Likewise students themselves may become confused as to the purpose of a lesson and be unable to evaluate their own progress in the course. This is the more likely to occur if course objectives are vague or unclear. There is danger of students becoming confused as to the real purpose of the lesson or course if tests measure only factual recall. Frequent testing provides for flexible teaching. It permits reteaching when the need is indicated *before* the end of the course. It permits the teacher to change subsequent lessons before they are presented. So-called objective tests and periodic face-to-face discussion periods have been used to provide this continuous evaluation. An evaluation program combining both discussion periods with oral questions and paper-and-pencil tests appears to best satisfy the need for continuous evaluation.

44. Use of Television as a Testing Medium

TV as a medium for testing offers the teacher advantages somewhat similar to those attainable with motion pictures, although with more flexibility and less disturbance in the testing room.

Dramatized situations.—Through the use of dramatized situations, the teacher can create on the TV screen a near-to-life situation for the student.

Testing for student understanding or ability to apply principles is particularly suited to dramatization. The use of short dramatizations, telecast to students at short intervals, will provide a series of question situations. Prior to the telecast students are furnished with multiple choice alternatives to the situation to be dramatized. Alternatives can either be listed on an answer sheet or displayed in the testing room. Similarly, true-false or completion questions can also be used. Thus, learning is measured in a realistic context. In missile training, a short dramatization of a crew member performing his duties during a missile firing can be shown to the students being tested. Their understanding of the crewman's duties may then be questioned on each operation performed during the countdown. Such testing is near to reality. It gives an excellent idea of the student's ability to perform countdown operations for any crew position desired.

Dramatization is effective when the teacher wants to evaluate the student's ability to react rapidly in normal or critical situations. A severe thunderstorm, for example, using tape or film might be telecast, showing an aircraft buffeted by updraft and heavy rain. A closeup quickly follows of the aircraft flight instrument panel. A multiple-choice question listing four alternative courses of action for the pilot trainee is an appropriate way of measuring his ability to react within an acceptable time period. Reaction time is measured by the interval between the end of one dramatization and the beginning of the next. For most effective measurement, students should be instructed to read the alternatives and become familiar with the possible answers prior to telecasting the drama.

Learning that takes place from watching something done is often neglected in testing. Test questions tend to emphasize learning as a result of hearing a lecture or reading of course study materials. Accuracy of observation is also an important part of many skills. Television testing is an effective way to measure both learning as a result of viewing and the accuracy of observation. For instance, measurement of student-learning gained by watching a military court in action is possible, or the sequence of steps in assembly of a complicated electronic unit.

Sometimes it is desirable to give students short tests to measure factual information, for example, to determine if study assignments are completed. Short televised tests meet this need very well. True-false or completion questions are probably the most useful for this purpose.

Instructor observation.—Telecasting to the student is only one way TV can be used in student evaluation. The process can be reversed with the teacher viewing the students (Figure 36). Determining a student's ability to lead a group to the solution of a problem is an example. Another is the effectiveness of the guidance techniques displayed by a student teacher in group discussion. Many other possibilities will suggest themselves

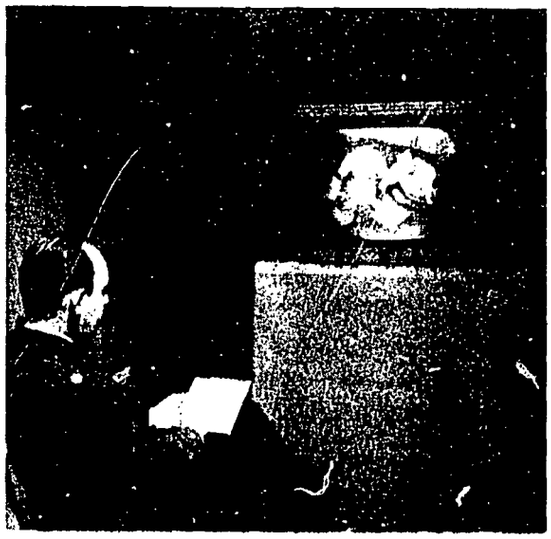


Figure 36. Evaluating student activity.

to the teacher. A rating scale suitable to the subject and the situation helps to provide more objective grading of student performance.

Limitations of TV testing.—Television as a testing medium also has serious limitations. Attention must be given to minimizing these limitations or the success of a testing program designed to measure student achievement may be endangered.

Air Force instructional objectives usually specify student learning at the understand or apply level. Only minor portions of most Air Force courses have objectives seeking knowledge of factual materials. Televised tests to measure student achievement generally test the student's ability to recall factual material. The design of tests to measure understanding and application is very difficult with the type of objective tests available to the TV teacher.

The technical problem of available screen space in which to present a complete test question and the corallary problems of readability and viewing distance are not easily resolved. Attempts have been made to eliminate the problem. True-false questions can be used; however, true-false questions are weak in measuring understandings and abilities to apply learning. Completion tests have been used with some success. Multiple-choice tests have been prepared using one set of four alternative responses for all test questions. Such questions are difficult to construct for measurement of learning higher than the recall level.

When tests are presented to students on the television screen, a compromise on both viewing time and student working time must be made for each question. If viewing and working time is set at one minute, for example, some students will need more and some will need less time. Slower students might more profitably spend all the testing time on the first forty questions of a fifty-question test and not attempt the final ten questions. Better students may be wasting time on easy questions that could more profitably be spent on more difficult test items. Any solution to this problem is a compromise. That students be permitted to work at their own speed is an accepted principle of testing. It appears impossible to observe this principle when using television as the test medium.

In improperly designed paper and pencil tests, students often are able to look back to preceding questions for clues to help in answering other questions. With televised testing, retelecasting of questions is teacher-controlled. Students cannot readily get clues or answers from preceding items. Some increases in validity may result for improperly designed tests through televising. However, the properly designed test does not rely on such devices to achieve or increase validity.

The effect upon students of TV tests vary. Vigorous student objections can be expected to follow any but very short quizzes. Students believe they are unable to do their best on lengthy televised tests. On the other hand, student acceptability of short tests, ten questions or less, is generally good. The fact that short tests usually carry less weight in a student's overall grade than longer tests may account for this.

The psychological effects of any test on students have been recognized. It is generally agreed that these psychological factors may affect student performance. Well constructed tests are designed to minimize adverse psychological effects. If students continue to believe that televised tests do not give them a fair chance to show what they can do, psychological factors may be significant to validity.

Economy in manpower is desirable in testing. TV examinations can be wasteful of manpower unless tests are given in large rooms provided with adequate receivers. If small rooms are used, proctors are required to protect the integrity of

test items, and prevent students assisting each other during examinations.

45. Evaluating Teacher Performance

While the ultimate test of a teacher's ability to communicate knowledge may be thought to be the students' scores on examination, it becomes apparent quite readily upon closer inspection that the ability to impart facts is a poor measure of a teacher. The more understanding the instructor seeks to achieve in his students, the more difficult is the designing of tests and measurements for student learning.

Still, all in all, the teacher and school officials want to know how well the teacher communicates skills and ideas to his students and more than that, how much the teacher motivates and inspires the students to learn. Some means of evaluating the instructor's performance is an important part of teacher training and upgrading.

One of the most prevalent ways of evaluating a teacher's performance is by the pretesting and post-testing method. The test is given to the class before the lesson or course and again afterwards. The teacher's effectiveness is measured by the difference in student achievement disclosed by these tests. Of course, this type of test must of necessity be a test of reasoning rather than fact, else the student should always make a zero on the pre-test. Another evaluation of the teacher comes when analyzing student factual knowledge or ability to solve problems at various stages of the course. The validity of these methods is acceptable but not guaranteed since the variables which make a comparison difficult—time of day, size of sample group, intellectual level of class, study distractions, etc.—all tend to lessen the possibility of achieving a perfect test.

Since the so called objective test is not perfect it behooves the teacher to accept as equally valid the critique method of evaluating his performance. In this case a set of standards must be established which if met perfectly would produce the ideal teaching. Whether or not the student learns a thing, the teacher is evaluated by his effort. This is really more valid and fairer to the individual. The television lesson is a performance that is staged for the viewer. It represents the teamwork of talent and production personnel and, therefore, if it is critiqued by one trained in the technique of comparing the performance of instructor and production crew against a standard established to represent the ideal, then it will have been evaluated with as much validity as is humanly possible. The teacher will be able to improve as will those behind the camera.

46. Self-Critiquing With Video Tape

The one great step which has been taken in television from the standpoint of evaluation is the development of video tape recording and playback. This new capability of the television medium has revolutionized the art of critiquing for it allows the person being critiqued to see for himself and forces the "critiquer" to be implicitly accurate. In addition, it overcomes the innate difficulty and distasteful reaction of being told your faults by another.

Video tape recording and playback is the foundation of the teaching concept of the Television Teaching Laboratory, Academic Instructor Course, Air University, Maxwell AFB, Alabama. In order to produce teachers capable of presenting a creditable television lesson, it is essential that the student TV teacher see himself at every opportunity by means of video tape. This same technique is of great use in the in-service training of all teachers and will eventually be commonplace through the use of low cost TV tape recorders (Figure 37). Most military installations having television facilities will have the capability of taping and playing back an instructor's rehearsal. Such a capability should not be wasted and will

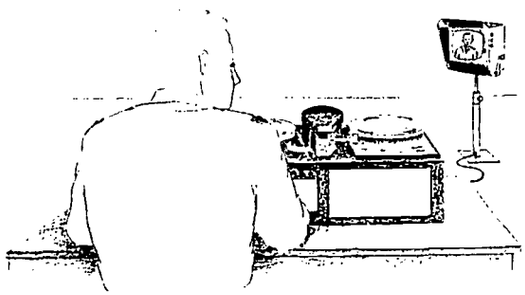


Figure 37. Video tape affords instructor immediate and complete self critique.

not be, so long as the Air Force continues to have dedicated instructors willing to strive for self-improvement.

Review Questions

1. Why is a clear statement of instructional objectives necessary for evaluation purposes?
2. What is the most important result of frequent testing?
3. What is the value of using dramatizations in testing?
4. Why is a standard necessary when using the critique method of teacher evaluation?

References for Further Reading

Books

BECKER AND HARSCHBARGER. *Television: Techniques for Planning and Performance,* Henry Holt and Co., New York, 1958.

BECKER, SAMUEL L., MURRAY, JAMES N., JR., BECHOLDT, HAROLD P. *Teaching by the Discussion Method,* State University of Iowa. 1958.

BLUEM-COX-MCPHERSON. *Television In the Public Interest,* Hastings House, 1961.

BRETZ, RUDOLPH. *Techniques of Television Production,* McGraw-Hill, New York, 1962.

BRETZ, RUDY AND EWING, RUSSELL H. *Educational Television and Closed Circuit TV; A Manual Directory and Bibliography,* Beverly Hills, California, National Institute of Leadership, 1959.

BUTLER, SAMUEL L., DUNLAP, RHODES and GERBER, JOHN C. *A Comparison of Three Methods of Teaching Modern Literature,* The State University of Iowa, Iowa City, Iowa, June 1957.

CARPENTER, C.R. AND GREENHILL, T. P. *Instructional Television Research, Report Number Two,* The Pennsylvania State University, University Park, Penn., Spring 1958.

COSTELLO AND GORDON. *Teach with Television,* Hastings House. 1961.

Division of Extension and Higher Education, *An Experiment in Instructional TV,* in the Los Angeles Junior Colleges, Los Angeles City School Districts, California, January 1959.

DUROST, WALTER N. AND PRESCOTT, GEORGE A. *Essentials of Measurement for Teachers,* New York, Harcourt Brace, 1962.

ERICKSON, CLIFFORD G. AND CHAUSAW, HYMAN M. *The Chicago City Junior College Experiment in Offering College Courses for Credit Via Open Circuit Television,* March 1959.

Florida University, Gainesville, College of Education, Education Library, *Television In Education,* 2d edition, 1962.

Ford Foundation, *Teaching by Television,* 477 Madison Ave., New York 22, N.Y., May 1959.

Hagerstown Board of Education, *Teaching in Washington County Closed-Circuit Educational Television Project,* Progress Report, Hagerstown, Maryland, March 1959.

HOLLAND, BENJAMIN F., AND OTHERS. *Audio-Visual Materials and Devices,* Rev. Ed., Lubbock, Texas, Rodgers Litho, 1958.

JOHNSON, GRACE NICHOLS. *The Norfolk City Experiment in Instructional Television, The Big Picture,* September 1957-June 1960, The Educational Television Project, 735 Pembroke Avenue, Norfolk 7, Virginia.

KELLER, ROBERT JR. AND GOULD, ORRIN E. *Closed Circuit Television in Teacher Education,* University of Minnesota, Minneapolis 14, Minn., June 1957.

KIDD, JAMES R. *How Adults Learn,* New York, Association Press, 1959.

KINDER, JAMES S. *Audio-Visual Materials and Techniques*, New York, American Book Company, 1959.

KLAUSMEIER, HERBERT J. *Learning and Human Abilities*, New York, Harper, 1961.

LEPORE, ALBERT R., and WILSON, JACK D. *An Experimental Study of College Instruction Using Broadcast Television*, San Francisco State College, San Francisco, Calif., Fall, 1958.

LEWIS, PHILIP. *Educational Television Guidebook*, McGraw-Hill Book Company, New York, 1961.

MACOMBER, F. GLEN. *Final Report of the Experimental Study in Instructional Procedures*, Miami University, Oxford, Ohio, 1960.

Midwest Program on Airborne Television Instruction, *Using TV in the Classroom*, Edited by Mary Howard Smith, New York, McGraw-Hill, 1961.

MILLERSON, GERALD. *The Techniques of Television Production*, Hastings House, 1961.

Mohawk-Hudson Council on Educational Television, *Producing Your Educational Television Program*, Schenectady, New York, 1961.

NOLAN, JOHN E. *Preparation of Inexpensive Teaching Materials*, San Francisco, Calif., Chandler Publishing Co., 1963.

Philadelphia Public Schools, 1958–1959, *Second Report of the National Experiment of Television Teaching in Large Classes.*

SCHRAMM, WILBUR L. *The Impact of Educational Television*, Urbana, Ill., University of Illinois, 1960.

SHERK, DENNIS H. AND KEPLER, LUTHER, JR. *Guide for Television Instructors*, Pennsylvania State University, Academic Research & Services Division, University Park, Penn., 1961.

SIEPMANN, CHARLES A. *TV and Our School Crisis*, Dodd, Mead and Co., New York, 1958.

SPEAR, JAMES. *Creating Visuals for TV*, Division of Audiovisual Instructional Service, National Education Association of the U.S.

STANTON, ROBERT S. *Performance: A Study of Microphone Techniques for Radio, Television and Film*. Coral Gables, Fla., University of Miami Press. 1961.

STARLIN, GLENN AND TALLAS, JOHN E. *Inter-Institutional Teaching in the Oregon State System of Higher Education*, Oregon State System of Higher Education, Eugene, Oregon, March 1960.

STODDARD, ALEXANDER J. *Schools for Tomorrow: An Educator's Blueprint*, The Fund for the Advancement of Education, New York 21, N.Y., 1957.

THOMAS, MURRAY R., and SWARTHOUT, SHERWIN G. *Integrating Teaching Materials*. New York, Longman, 1960. Creating Television Programs, Chapter 18.

TRAW, GLEN H. *Second Year Report Southwestern Indiana Educational Television Council*, 1959–1960, Southwestern Indiana Educational Television Center, 425 Carpenter St., Evansville 8, Ind.

WALTERS, ROGER L. *Training the Teacher for TV; A short course in preparing the new teacher for using the medium.* Rev. Sacramento State College, Sacramento, Calif., 1960.

Wayne, RCA Invitational Conference on Televised Instruction, Wayne University. *Televised Instruction*, Edited by Lee S. Dreyfus and Wallace M. Bradley, Detroit, Mass Communication Center, Wayne State University, 1962.

WILLIS, BENJAMIN C. *Chicago's TV College,* Chicago City Junior College, July 1960.

ZETTL, *Television Production Handbook,* Wadsworth, San Francisco, 1961.

Manuals

Communications Techniques, CSC–1, Command and Staff College, Air University, Maxwell AFB, Alabama, September 1957, Revised January 1960.

Principles and Techniques of Instruction, Academic Instructor and Allied Officer School, Air University, Maxwell AFB, Alabama, 1963.

Training by Television, TM 11–491, Department of the Army, 1959.

Pamphlets

Headquarters USAF TV Planning Guide, Secretary of the Air Staff, Staff Management Division.

Production Planning Guide AFSC 11–1, Air Force Systems Command, 1962.

Program Planning Guide, Television Center, 3825th Support Group (Academic), Air University, Maxwell AFB, Alabama, 1963.

Television Planning Guide, WFM–TV, U.S. Army Signal School, Fort Monmouth, N.J., 1960.

WKTC–TV Brochure, Keesler Technical Training Center, Keesler AFB, Miss.

Proceedings of the NEA Leadership Seminar on the Role of Television in Instruction, National Education Association, Washington, D.C., 1958.

ADAMS, JOHN D., CARPENTER, C. R., AND SMITH, DOROTHY R. *College Teaching by Television,* American Council on Education, Washington, D.C., 1958.

CARPENTER, C. R. *A Perspective of Televised Instruction,* Pennsylvania State University, October 1957.

FOSHAY, MRS. FINETTE P. *Interaction In Learning: Implications for Television,* National Education Association, 1201 Sixteenth St., N.W., Washington 6, D.C.

FRAZIER, ALEXANDER. *Opportunities for Learning: Guidelines for Television,* National Education Association, 1201 Sixteenth St., N.W., Washington 6, D.C.

GREENHILL, L. P. *Televised Instruction or Instructional Television?* NAEB Seminar, Pennsylvania State University, University Park, Pennsylvania, August 26, 1959.

OLMSTEAD, F. E., AND GRAF, R. W. *Talkback/The Missing Ingredient, Audio Visual Instruction,* National Education Association, Vol. 5, Nr 4, April 1960.