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## COMMENT

# The Design of Videotape Systems for Legal Education

*Dale A. Whitman\* and Gerald R. Williams\*\**

Over the past 20 years in which videotape technology has been commercially available, considerable literature has offered encouragement and advice concerning its general educational applications.<sup>1</sup> More recently, a developing body of literature, materials, and practices has brought videotape to the attention of legal educators.<sup>2</sup> One of the chief impediments to realization of the full potential of videotape in legal education, however, is the lack of an adequate description of the necessary facilities and electronic equipment.<sup>3</sup> This comment will discuss the basic uses of videotape in legal education and the physical facilities and equipment (including types, arrangement, and costs) that might be prepared to accommodate these uses. The comment will conclude with an illustrative description of the specific videotape system that has been developed for the J. Reuben Clark Law School at Brigham Young University.

### I. USES OF VIDEOTAPE IN LEGAL EDUCATION

The potential uses of videotape in legal education range from the obvious to the highly creative. One of the most obvious uses is re-

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<sup>1</sup>See, e.g., THE CARNEGIE COMMISSION ON EDUCATIONAL TELEVISION, PUBLIC TELEVISION, A PROGRAM FOR ACTION (1967); H. CASSIRER, TELEVISION TEACHING TODAY (1960); THE FARTHER VISION: EDUCATIONAL TELEVISION TODAY (A. Koenig & R. Hill eds. 1967); FORD FOUNDATION, TEACHING BY TELEVISION (1959); THE IMPACT OF EDUCATIONAL TELEVISION (W. Schwamm ed. 1960); NEW MEDIA AND COLLEGE TEACHING (J. Thornton & J. Brown eds. 1968). Current periodicals in the field include *Audiovisual Instruction*, *Communication News*, and *Educational Television*.

<sup>2</sup>The most advanced treatment of videotape's potential is an article by Ronald Dresnick in which he explores the character and dynamics of videotape as a medium as well as its potential in legal education. Dresnick, *Uses of the Videotape Recorder in Legal Education*, 25 U. MIAMI L. REV. 543 (1971) [hereinafter cited as Dresnick]. See also Audio-Visual Committee, American Ass'n of Law Libraries, *Summary of Audio-Visual Materials Used in Legal Education: Audio-Visual Committee Report—June 1967*, 60 LAW LIBRARY J. 272 (1967) [hereinafter cited as *Summary*]; Kornblum & Rush, *Videotape in Legal Education*, 4 ALI-ABA CLE REV., Feb. 2, 1973, at 4 [hereinafter cited as Kornblum & Rush]; Rush, *Legal Educators Advocate Video Tape*, EDUC. BROADCASTING, Nov.-Dec. 1973, at 11 [hereinafter cited as Rush].

<sup>3</sup>Although the information is not as current as desirable, it is notable that a 1967 survey of all accredited law school libraries found that closed-circuit videotaping

ording events that occur in the classroom or lecture hall for later playback. This allows guest lectures and the more repetitive portions of some law school courses to be preserved for additional usage without further preparation time on the part of the participants. It should be recognized, however, that recordings of these types of events are not as stimulating as other videotape applications, though their ability to maintain the viewer's interest can be enhanced by the use of split screens and other special effects.<sup>4</sup>

A second category of uses involves recording law students as they engage in mock exhibitions of various legal skills such as interviewing and counseling, negotiating, trial practice, and appellate court arguments.<sup>5</sup> The primary value of videotape in this context is that it gives the student an opportunity for more meaningful self-evaluation. Rather than relying on his own recollections of his performance or the verbal descriptions of others, the student can replay the tape and watch himself in action.<sup>6</sup> The versatility of videotape replay allows him to review his performance in private, with other students in or out of class, or with the instructor. The instructor's feedback can be received by the student at a time when the student is no longer preoccupied with his original presentation. Moreover, his performance may be repeated as often as desired for closer analysis of its strengths and weaknesses.

A videotape system also permits a student to practice his presentations in relative privacy, review what he has done, and record again as he sharpens his skills. Again, any or all of these successive recordings can be preserved for later review by an instructor. Additionally, examples of presentations made in one class can be preserved for viewing by later classes, thereby helping them to perceive more quickly the skills involved.

Videotape may also provide the answer to criticisms leveled against the Socratic method for failing to provide the student with adequate feedback on the quality of his participation. For the past year, at least one law professor has been recording all student recitations in his first-year law class and then bringing the students into his office the same day to review and grade their performance.<sup>7</sup> Al-

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capabilities were available in only seven of them. The researchers reported that in the few libraries having videotape capability, it was used primarily for bringing "outsiders" into the classroom, including courtroom activities, lectures, and "great teachers." *Summary* 275.

<sup>4</sup>The basic equipment necessary to introduce these production techniques is described in Part IV *infra*. For additional information about special effects see Killion, *Program Switching and Special Effects for the Small Studio*, EDUC. & INDUS. TV, April 1973, at 17.

<sup>5</sup>See, e.g., White, *The Lawyer as Negotiator: An Adventure in Understanding and Teaching the Art of Negotiation*, 19 J. LEGAL ED. 337 (1967).

<sup>6</sup>This process of self-evaluation is described by Dresnick as an "unfolding of information" in which the student "is given the rare opportunity to see himself as others see him and to react to the information. It is this very feedback process that is totally lacking in Socratic legal education today." Dresnick 584 (citation omitted). See also Kornblum & Rush 5.

<sup>7</sup>Professor Woodruff J. Deem of the J. Reuben Clark Law School at Brigham Young University has used this procedure successfully in his first-year criminal law and criminal

though this involves a rather high expenditure of time on his part, it has proven to be a very fruitful learning experience for his students.

A third category involves the use of experienced attorneys in actual or simulated settings to demonstrate or model the legal skills being taught the students. The types of skills that can be demonstrated are as varied as the practice of law: interviewing and counseling clients, taking depositions, negotiating settlements of cases, conducting closings of commercial transactions, and participating in all aspects of trial and appellate practice.

Although other elements of the law school curriculum are also designed to give students exposure to the actual practice of law, the quality of the experience offered in clinical education and similar courses is limited by the fact that only one student generally experiences a given situation. Moreover, even if the student has the benefit of an instructor's supervision, there is a limit on the amount of time an instructor can spend reflecting and commenting upon an individual student's experiences. In contrast, experiences preserved on videotape can be played before a seminar group or even a large class. The entire group can evaluate and reevaluate the experience, pausing at appropriate points for more detailed attention and comment from the instructor.

In some settings, videotape can offer additional advantages over live experiences. For example, the questioning of a witness by an attorney at trial can be recorded by two cameras, one focused on the witness and the other on the attorney. The two images can be joined together on a split screen, so that viewers can see the facial expressions and demeanor of both persons, while spectators in the courtroom would normally see only the back of the attorney. Likewise, videotape cameras can zoom in on the facial and bodily responses of the participants and transmit them onto any number of monitors. Thus, with properly positioned monitors, persons sitting at the back of a large classroom can see the nonverbal behavior of the person being recorded almost as well as if they were seated face-to-face.<sup>8</sup>

Two further advantages of videotape recordings should also be noted. First, videotape replays are available at any time convenient to teacher and student, so that problems of scheduling, transportation, and group interference are avoided. Second, copies of videotape materials are easily and inexpensively made, allowing the sharing of video materials between law schools and with the profession. A current example of such arrangements is found in the audio-visual center at the Hastings Law School. The center includes two carrels equipped with video playback equipment and a library of over 100 different video cassettes that students may check out and view at their convenience. Many of the tapes were produced as part of the National College of Advocacy, initiated at Hastings Law School in 1971, and

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procedure classes. Approximately 130 students participate in this process each semester

<sup>8</sup>Dresnick 561.

have been nationally distributed to a number of other law schools and bar organizations.<sup>9</sup>

A final category involves the use of *portable* videotaping equipment to "enter the real world and look at legal process, courts, and administrative agencies."<sup>10</sup> Perhaps the most important function of this type of *cinema verité* documentation would be to follow one attorney's experience with the actual development of a case from first interview to final resolution, so that all of the raw facts could be presented to students. As one author has suggested:

The information gathering ability of the videotape recorder offers legal educators a means of correcting a major deficiency in the case method, the fact that it does not allow the student to deal with or synthesize raw facts, . . . "The student needs to see, and to participate in, the process by which facts are organized for presentation or are analyzed. . . ."<sup>11</sup>

Although there are obvious concerns in the *cinema verité* approach with protecting the interests and privacy of clients, there are many types of proceedings, including administrative hearings and meetings of various governmental councils, that are open to the public and where permission to make video recordings for educational purposes is either unnecessary or easily obtained. Moreover, canon 3 of the Code of Judicial Conduct has been amended to allow judges to authorize videotape and other types of recording in the courtroom when done for educational purposes.<sup>12</sup> In addition, some trial judges have taken the next step and have approved a closed-circuit system that continuously transmits all of the activities in a particular court-

<sup>9</sup>Rush 12. "The bulk of the programs in the video cassette library are panels, lectures and demonstrations from the National College of Advocacy [held annually at Hastings since 1971]." *Id.*

<sup>10</sup>Dresnick 582. Portable videotape equipment is now sufficiently advanced technologically to be relatively unburdensome in cost (below \$1200), size, and weight. See generally Dresnick 590; Rush 12.

<sup>11</sup>Dresnick 581 n.204 (quoting L. Fuller, *Preliminary Statement of the Committee on Legal Education*, in *ISSUES IN LEGAL EDUC.* 272, 274 (D. Bok ed. 1971)).

<sup>12</sup>Canon 3(A)(7) of the Code of Judicial Conduct provides, in relevant part, as follows:

A judge should prohibit broadcasting, televising, recording, or taking photographs in the courtroom and areas immediately adjacent thereto during sessions of court or recesses between sessions, except that a judge may authorize:

....

- (c) the photographic or electronic recording and reproduction of appropriate court proceedings under the following conditions:
  - (i) the means of recording will not distract participants or impair the dignity of the proceedings;
  - (ii) the parties have consented, and the consent to being depicted or recorded has been obtained from each witness appearing in the recording and reproduction;
  - (iii) the reproduction will not be exhibited until after the proceeding has been concluded and all direct appeals have been exhausted; and
  - (iv) the reproduction will be exhibited only for instructional purposes in educational institutions.

ABA CANONS OF JUDICIAL ETHICS NO. 3(A)(7).

room to monitors located in a seminar room of a law school in the same city.<sup>13</sup>

On a more private level, there are surely many cases in which the interests and privacy of the client would not be jeopardized by video recording procedures if the cases were properly screened, the tape were not used until after the case had been completely resolved, and the client freely gave his consent prior to the recording procedure and maintained a subsequent veto power over the educational use of the recordings.

## II. PHYSICAL FACILITIES NECESSARY FOR OPTIMAL USE OF VIDEOTAPE

Part of the difficulty in obtaining maximum benefit from videotape applications in legal education lies in the fact that suitable physical facilities and electronic equipment are not typically available in law school buildings. In an effort to reduce these technical problems, the remaining portions of this comment will describe the basic facilities and equipment necessary for optimal use of videotape in legal education. Although the materials included here were developed to assist the authors in the overall design of a videotape system for the new law school building at Brigham Young University, it should be clearly noted that the authors became involved in this design long after the building was planned and construction underway. The only accommodation to videotape included in the building plans were conduit links between the law building and the central campus closed-circuit system, and between the moot courtroom and several of the class and seminar rooms. Although this conduit avoided the necessity of running cables along the floor within the moot courtroom and between class and seminar rooms, this convenience did not obviate the necessity of making several important changes in the building after it was constructed. In short, each of the changes suggested below can be made in an older building.

There are four types of rooms that may be required to videotape the various types of legal activities that might be included in the curriculum. The first type is the large classroom, or, preferably, moot courtroom, where trial and appellate practice may be conducted and recorded. These activities may range from hearings on motions to full trials and appellate arguments and, as described above, may be either simulated or actual events. It is also possible to use this large room to record the oral recitations of students as they participate in the classroom dialogue.

The second type of room required is a classroom or seminar room of medium size, perhaps in the range of 250 to 1000 square feet, in which small-group legal activities, such as administrative hearings, labor negotiations, or informal boards of review, could be recorded. This room could also be used by seminar-size classes to view and discuss video recordings.

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<sup>13</sup>For a description of one such arrangement at the University of Michigan Law School, see Dresnick 568 n.154.

A third type of room should be smaller still, perhaps 75 to 150 square feet, and should be equipped to provide the proper setting and environment for recording activities typically performed in a law office. These activities might include interviewing and counseling clients, negotiating with other attorneys, and demonstrating the mechanics of good law office management, such as record keeping and information storage and retrieval.<sup>14</sup> Because of the limited space in this type of room, it is preferable that the video cameras be wall mounted and controlled from an outside control area so as to be as unobtrusive as possible. The utility of the law office setting may be enhanced by installation of a one-way mirror between the office and an adjoining room. For this procedure to work properly, it is necessary that the adjoining room be equipped so that it can be completely darkened in order to prevent disclosure of the observers. Panels or draperies should also be installed so that they can be moved in front of the mirror if it is desired to conduct the interview or other activity in private.

The fourth and last type of room is more convenient than necessary, but if feasible would contain several stalls or carrels fitted with video players and monitors so that individual students could check out and view tapes at their convenience.

Assuming that some or all of the above facilities can be provided, careful attention should be given to obtaining proper equipment for them. It is important, for example, not only that the equipment be of satisfactory quality and that the individual components be compatible with each other, but also that the components be suitable for the various uses that will be made of them. Since this may seem obvious, an illustration may serve to identify the problem. In describing a video system set up to record various aspects of trial practice, one observer noted:

It was the expressed desire to show both the witness and the student lawyer on the screen at the same time. Thus both cameras had to be utilized with the special effects generator. Since the cameras had no viewfinders, it was necessary to connect one of the television monitors to one of the cameras so that the cameraman could see what his camera was pointed at. This meant that the other camera had to be aimed by intuition. Furthermore, since there were four roles played, it was necessary to use a sound mixer and four microphones. Two operators were used. One worked the special effects generator, the sound mixer and the videotape recorder. The other operated both cameras. The camera that was not connected to a monitor was to remain in a stationary position pointed at the witness. The other could be aimed at the attorney. The results of this were a poor image and very annoying audio

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<sup>14</sup>The idea for a mock law office, as compared to a functioning clinical office, first came to us in an article by Louis Brown in which he describes an office that he developed at the U.S.C. Law Center. Part of his plan is "to encourage practicing lawyers in the community to use the room as their law office for particular matters" so that students can "observe lawyers at work in [a] law office lawyering setting." Thus, lawyers are encouraged "to conduct consultations in the view of the students." L. BROWN, PLANNING

signal. One of the microphone cords produced an audible hum that destroyed any usefulness the tape might have had.<sup>15</sup>

Section III and IV of this comment describe the general characteristics of a system that will avoid or at least minimize these kinds of problems.

### III. TECHNICAL REQUIREMENTS FOR A VIDEO SYSTEM

It is of critical importance that the actual users of the videotape system, the legal educators, have a clear concept of the nature and capabilities of the various components of the system and the ways in which they can be interconnected to produce the desired educational results. It is unlikely that any engineer can provide the pedagogical expertise necessary to produce a system with maximum serviceability at minimum cost. The information presented below is therefore intended as a general guide to the building blocks of a system for law school use. Once a basic design has been agreed upon, however, law faculty members and administrators should seek professional assistance from the television design personnel of their university's staffs, private consultants, or representatives of the various equipment manufacturers.<sup>16</sup> Another article appearing in this issue, *An Assessment of Videotape in the Criminal Courts* by Short, Florence, and Marsh, contains an excellent discussion of equipment and system design for courtroom use, much of which is applicable to law school installations. Rather than attempt to repeat that discussion, this comment will focus on additional problems unique to legal education.

The basic components of any videotape recording system are recorders, cameras, microphones, and control equipment. In the portion of the comment which follows, the basic characteristics of each of these items will be discussed, with particular emphasis on features desirable in the law school setting.

#### A. The Videotape Recorder

Recorders are available in a variety of styles employing tape widths from ½ inch to 2 inches. Although the wider formats produce

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BY LAWYERS: AN INTRODUCTORY COURSE IN THE PRACTICE OF PREVENTIVE LAW 280-81 (4th temp. ed. 1972). One drawback of Brown's mock law office is that it is located in a seminar-size room and includes two rows of desks and chairs for law students viewing the activities. There is a danger that their presence may affect both the willingness of attorneys and clients to use the office and the quality of the activities conducted there. Perhaps the best solution to this problem is to hide the law student observers behind a one-way glass, as suggested in the text, or to have remote control video cameras installed in the room to transmit the scene to the students in an adjoining room. None of these procedures, of course, is acceptable without the full knowledge and consent of the attorney and the client.

<sup>15</sup>Dresnick 585.

<sup>16</sup>Several factors must be considered in selecting equipment. One obvious item is cost. Weight, bulk, and portability are also important, especially if there is to be no central control room in which equipment can be installed on a permanent basis. Since continual maintenance of video equipment is a necessity, the capabilities of the uni-

higher quality pictures and are more suitable for broadcast use, the half-inch format is adequate for instructional purposes. The new cassette recorders are also substantially more attractive than the earlier reel-to-reel models because of their ease of operation and reduced possibilities for operator error.

Several features should be considered when selecting a recorder for educational use. Some models provide two separate audio tracks on the tape, making it possible to record the student's presentation on one channel and to insert the comments of the instructor on the other channel at a later time. A "pause" control is also extremely useful in the playback function, since it permits the instructor to stop the machine momentarily to make a comment to a student or class without disengaging the tape from the tape head mechanism and waiting for it to reengage—a process which requires about 10 seconds.

Finally, since recorders with color capability are available at a cost not much greater than that of black-and-white models, these recorders should seriously be considered if there is any prospect of using color videotape in the foreseeable future. In fact, virtually all of the components of a videotape system, with the exception of the cameras, can be purchased with color capability for only a modest increase in cost above black-and-white equipment. At present, however, the least expensive color cameras are priced in the \$5,000 range, while excellent black-and-white cameras can be purchased for about \$800. One solution to this dilemma, and the one actually followed in the specific system described below, is to purchase black-and-white cameras but to buy most other components of the system with color capability. Thus, in the event prices of color cameras continue to decline, at the time their purchase becomes feasible no other expenditures would be necessary.

### *B. Cameras*

A basic videotape system should include at least two cameras, since there are several types of instructional settings requiring the use of multiple cameras. For example, in interviewing and counseling clients or in examining witnesses, it is often desirable to have one camera directed toward the attorney and the other toward the client or witness. If absolutely necessary, an experienced operator using a single camera with a zoom lens can cover such activities. However, the constant camera motion and the zoom effect as the lens' focal length is changed by the operator prove quite distracting to the viewer. To facilitate multiple camera coverage, both cameras should be equipped with electronic viewfinders, which enable the camera operator to see on a small picture tube the exact picture being sent.

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versity's maintenance facilities or those of outside firms must be investigated. The components of the system must be electronically compatible with one another, and if students or others with limited training will operate the equipment, operation should be as simple and foolproof as possible.

Both cameras should also be equipped with zoom lenses. Although zooming while a camera is on the air is distracting unless carefully and slowly performed, a zoom lens is nonetheless extremely useful in "setting up" the desired shot while the alternate camera is on the air. Consideration should also be given to the light levels of the rooms in which the cameras will be used, although modern cameras are sufficiently sensitive that inadequate lighting is rarely a problem.

### *C. Microphones*

A minimum of four microphones is needed for adequate coverage of a courtroom setting. Microphones on desk stands should be provided for the judge and the witness, and either desk stand or lavalier microphones should be provided for counsel. For interviewing and negotiating sessions that occur across a table, a single microphone placed directly on the table will pick up with excellent clarity the "floor wave" of sound which travels across the table surface. A useful accessory is a "mike mouse," a sponge-rubber device which supports the microphone just above the surface of the table and isolates it from shock if the table is tapped.

Audio pickup of student recitation in a large classroom is more difficult. One solution is to use hanging microphones. However, a substantial number of microphones would be required for a very large classroom, and they are somewhat unsightly. In some rooms, a suitable alternative solution may be a "shotgun" microphone mounted on top of and pointed in the same direction as the camera used to record student recitations. Such microphones, typically rod shaped and 18 inches to 2 feet in length, are highly directional and permit reasonably good pickup of a person speaking in a normal tone up to approximately 200 feet away. Only experimentation in the classroom in question can establish which type of microphone system is superior.

### *D. Control Equipment and Monitors*

If two or more cameras are to be used on the same program, it is necessary to have a video switcher to select among them. Inexpensive switchers are available which accomplish instantaneous switching, fades, and lap-dissolves. At some additional cost, a switcher can be purchased which includes a "special effects generator." Such a switcher makes possible a number of additional techniques such as vertical and horizontal wipes, corner inserts, and split-screen pictures. These techniques are highly useful when showing simultaneous close-ups of two persons negotiating or conversing or of an attorney examining a witness.

Another valuable device when multiple cameras are used is a set of small monitors mounted near the switcher showing the output of each camera in use. Several manufacturers produce monitor packages with two or three side-by-side picture tubes, each about 5 to 9 inches

in diagonal measurement. It is also desirable to have a separate monitor showing the actual picture being fed by the switcher to the videotape recorder.

Additional monitors will be needed for playback purposes in classroom and individual sessions with students. If the videotape recorder and its associated monitor are heavily scheduled for recording purposes, one attractive approach is a second playback-only machine mounted with a suitable monitor on a moveable cart. The monitor's size will, of course, depend on the size of audiences expected to view it, but monitors in the 17- to 22-inch range will be appropriate for most situations. In classrooms in which instructional material will be viewed regularly, it may be desirable to purchase several monitors and mount them permanently on the front walls or hang them from the ceiling of the room.

Finally, since most videotape recorders have only a single audio input, an audio mixer will be necessary for multimicrophone programs. The mixer should accommodate four to six microphone inputs with a separate level control for each microphone, and should include a volume-unit or "VU" meter. This meter facilitates the adjustment of the level controls on the individual microphones to avoid noticeable differences in the volume of their outputs.

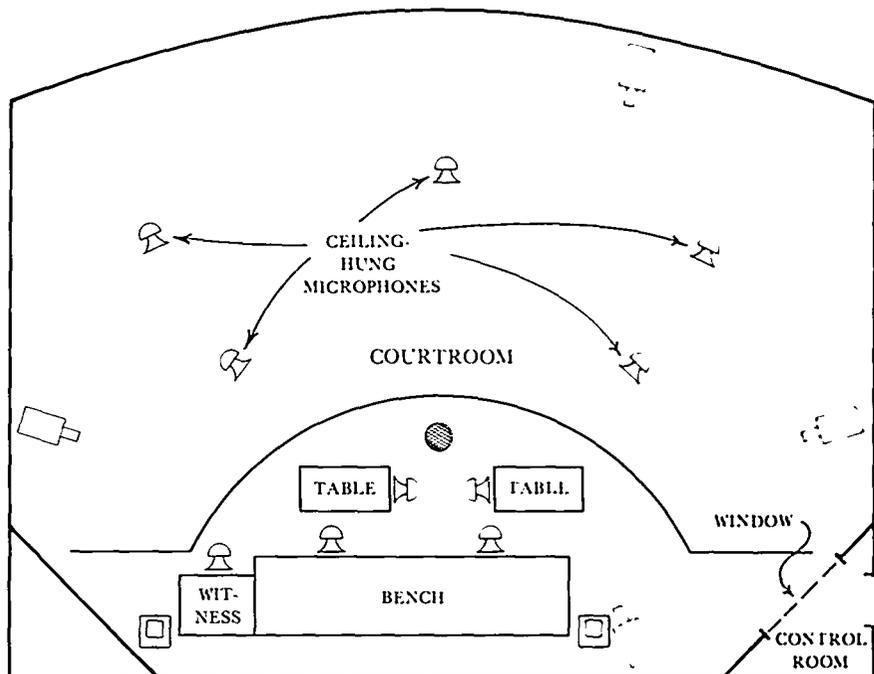
#### *E. Control Room*

When a multicamera program is being produced, it is highly advantageous to locate the videotape recorder, audio mixer, video switcher, and monitors in a room separated from the room in which the recorded events occur. This eliminates the noise of the recording machine and the movements of the switcher/recorder operator as sources of distraction to the persons being recorded. At the same time, it is highly desirable for the recorder operator to have the ability to communicate with the camera operators. An intercom system using telephone operator-style headsets is best for this purpose, and some cameras and video switchers have this capability built-in, with the intercom signal being carried through the normal camera cable.

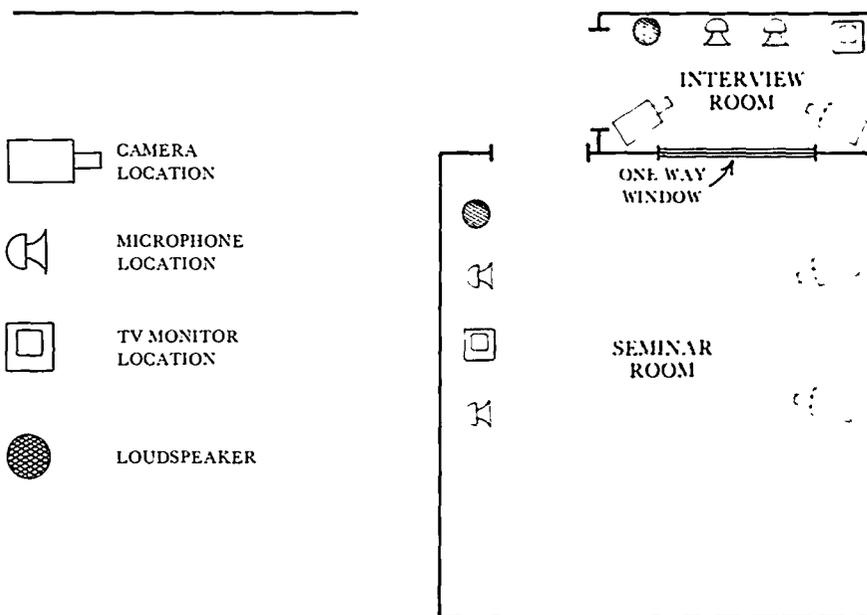
The control room may be physically separated from the room in which the program is being recorded by any reasonable distance, but maximum convenience results from situating it physically adjacent to the room in which the program is being produced and providing a window between the two rooms. This feature enables the control operator to see the entire program area and thus to better instruct the camera operators with regard to camera position, action to be followed, and focal length to be selected for zoom lenses. It is also desirable to include loudspeakers in the rooms in which programs will originate. By connecting those speakers to the intercom system, the control room operator is able to give audible instructions to persons in the recording room. While such instructions would not normally be given while recording, they are useful in "setting up" the

program and cueing the participants at the beginning of a taping system.

FIGURE 1



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## IV. ELEMENTS OF A PROTOTYPE SYSTEM

We conclude this comment with a description of the specific system designed for use in the new J. Reuben Clark Law School at Brigham Young University. However, because equipment model numbers, specifications, and prices are constantly changing, and because every law school's needs for facilities will vary, the details given below should be treated as merely illustrative. Engineering, design, and installation costs are not included.

As illustrated in Figure 1 (set forth on the preceding page), the system designed for the law school includes a courtroom, an interview room, and a seminar room. In addition, a small control room is located for convenient access to each of the other three rooms and has a window which permits the control operator to see activities in the courtroom. The control room console is shown in Figure 2. The system also includes a black-and-white playback-only videotape machine and a television monitor connected together on a cart which can easily be moved to any area of the law school for viewing of tapes previously made.

It will be noted that Figure 1 shows more camera and microphone locations than the actual number indicated on the following equipment list (see Figure 3). The reason for this apparent discrepancy is that it would be exceedingly rare for a situation to arise in which all camera and microphone locations would be in simultaneous use. Thus, cameras and microphones can be moved to the locations desired for recording a specific program. This approach requires careful scheduling to avoid potential conflicts in equipment use, but this is a small price to pay for the resultant savings in equipment costs.

FIGURE 2

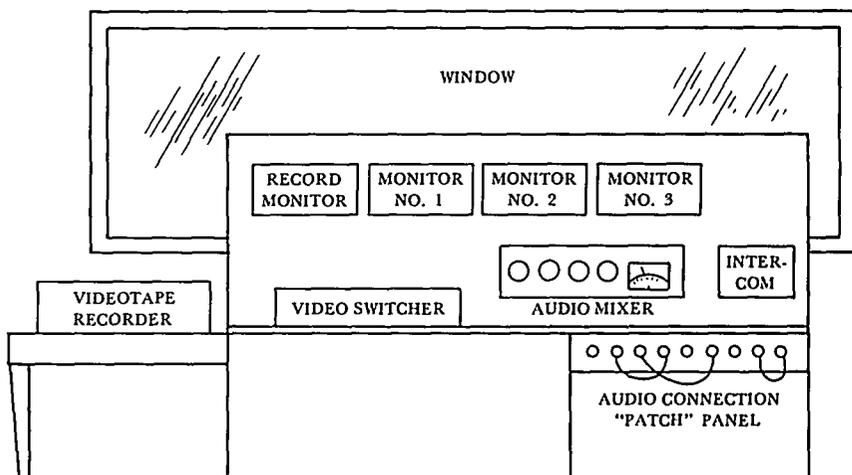


FIGURE 3

*Control room equipment*

1	Sony VO-1800 Videotape cassette recorder	\$1,320.00
1	Sony SEG-1A Switcher/Special effects generator	941.30
2	Conrac ENA-9/2R 2-screen video monitors (9")	1,160.00
1	Shure M-67 Audio mixer (4 inputs)	145.00
1	EIE Dual 15 RF amplifier (to distribute recorder output to multiple classroom monitors)	120.00
1	Altec 1606A Intercom amplifier	218.00
1	ADC Audio patch panel (to facilitate connection of various microphone locations to audio mixer)	28.00
1	Appropriate console cabinet	300.00

*Courtroom equipment*

2	Sony AVC-3200 cameras with viewfinders	1,550.00
2	Samson 7201-7301-7601 heavy-duty dolly-tripod-pan/tilt head assemblies	210.00
5	Electrovoice 660 microphones (ceiling hung)	370.00
2	Electrovoice 649A microphones	255.00
2	Electrovoice 635A microphones	120.00
2	Headsets for camera operators	100.00
4	Atlas DS4 microphone stands	60.00

*Interview room*

2	Sony AVC 3260 cameras without viewfinders	1,090.00
1	Electrovoice 660 microphone	74.00

*Playback system*

1	Sony VP1200 video cassette player	1,204.00
1	Motorola 17" black-and-white TV receiver	171.60
1	Winstead AV400 PTS Cart for above equipment	289.00

*Miscellaneous*

Cabling	200.00
Hardware	130.00
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*TOTAL COST* \$10,055.90

