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SCHMIDT, William Dean, 1933-
DESIGN ELEMENTS IN INSTRUCTIONAL FILMS: AN ATTEMPT
TO DERIVE SOME OPERATIONAL GENERALIZATIONS BASED
ON RESEARCH AND ON PRODUCER OPINION.

The Ohio State University, Ph.D., 1972
Education, theory and practice

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ACKNOWLEDGMENTS

I am indebted to many people who helped to make possible the completion of this study. My doctoral committee composed of Dr. John C. Belland, Dr. James K. Duncan, and Dr. Robert W. Wagner all made countless suggestions and supplied valuable guidance. Selected members of the University Film Association were highly cooperative in helping to form a Delphi panel of knowledgeable designers of instructional films. The participants in the Delphi survey gave freely of their time to a procedure which must have seemed at times to be without end. It is unfortunate that I cannot give them recognition individually in print, but, according to the terms of the Delphi agreement, they were to remain anonymous.

Space prevents the listing of the 128 superintendents and the 113 audiovisual directors who participated in the process of identifying the sample of films to be used for analyzation purposes. Two panels devoted many hours to the viewing and analyzing of these films. The members of the two panels were Dr. Ray Wiman, Dr. Charles W. Vlcek, Dr. Charles W. Wright, and Dr. Donald J. Murphy. The producers and distributors of the twenty films were all cooperative in supplying
preview prints, study guides, scripts, and information upon request. These individuals and firms are mentioned by name in Appendix I.

Many other people provided assistance and encouragement, not the least of them being my family. To my wife and children and to the other individuals not mentioned by name, I extend my gratitude. Without them, my task would have been much more formidable.
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"Production Facilities Within the IMC." Audiovisual Instruction, XII, No. 8 (October, 1967), 805-807.

"Local Production Program Components." Audiovisual Instruction, XV, No. 10 (December, 1970), 56-57.


Elementary Social Studies Series. Ten 8mm cartridge loop films. Santa Mónica, California: Doubleday Multimedia, 1965. (Co-producer)


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Studies in Audiovisual Education. Professor John C. Belland

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CHAPTER I

PROBLEM AND PROCEDURES

STATEMENT OF PURPOSE AND THE PROBLEM

Introduction to the Problem Area

While 16mm films were first used in the schools in the early 1930's, most of the early releases were commercially produced. Local school or teacher production of 16mm films came later, slowly at first and then at an accelerating rate, but never on a widespread basis. Also during the 1930's 8mm film got its start. It soon found quick acceptance by the amateur for home use. Invariably teachers began to experiment with 8mm and to make films for use in instruction. Later 8mm sound became a possibility, and still later an improved picture resulted when super 8mm film was introduced. These last two developments opened up even more possibilities for school or teacher production of instructional films.

The situation today is that the production of instructional films by school personnel is rather widely practiced. The bulk of the production activity is in the less expensive super 8mm medium, but 16mm has also witnessed substantial growth.
Along with this growth in the local production of instructional films has come an even more dramatic increase in their commercial production. In 1927-1928 the Eastman Kodak Company started this movement when they began experiments with twenty 16mm motion picture films that had been designed for school use.¹ Today, the latest issue of the Index to 16mm Educational Films lists over 70,000 film titles.²

In view of the substantial growth in the production of instructional films during the past forty years, it seemed important to examine the present methods used in arriving at design decisions. Fleming, Travers, and Lumsdaine³ have all concluded that experienced producers of instructional films rely on something considerably less than a well-defined set of design principles. Opinions supporting this


situation range from comments such as film making is more of an art than a science to comments that there is no comprehensive list of guidelines to follow. Some producers have admitted that they rely more heavily on educated hunches and guesses or on intuition rather than on concrete guidelines.  

The procedure of the novice film maker is even less scientific. He does not have the benefit of experience on which to base his design decisions. He seldom has easy access to the findings of research or expert opinion on matters of film design. The present study will be undertaken with this beginning instructional film maker foremost in mind. The question which will be studied is: What do research, educated opinion, and practice tell the novice film maker about the use of design elements in making instructional films? While the target audience is the novice film maker, in view of the situation described in the preceding paragraph, the results of this study may also be of value to the experienced producer of instructional films.

It would be presumptuous to say that it is now possible to devise a comprehensive list of design principles which could be applied universally in producing instructional films. Wagner aptly pointed out the pitfalls of applying standard formulas in cookbook fashion to the production of educational films:

---

4 Travers, *Audiovisual Information Transmission*, p. 11.
The making of an educational film, like the process of teaching, the process of human motivation, and the process of communication, is more an art than a science, at our present stage of knowledge of these matters. The elements of film design interact with each other, and with the perceptive characteristics of the audience, making the film experience a dynamic one, and in the final analysis, one which lies in the field of personal adventure.  

Elsewhere Wagner pointed out that while film making is still largely an art, scientific evidence was being amassed which could lead toward a more scientific design of instructional films. Carpenter, like Wagner, has written on the problem of blending art and science into film production:

Instructional film production involves, or should involve the employment of both artistic skills and scientific procedures and principles. This is one of the most difficult weddings to arrange. There is strong resistance on the part of many practical film producers to experimental evidence and to the objective analysis of the processes of filmic communication. The tradition of the film arts is long and firmly entrenched. This art has grown out of the theater and related technology. The film industries have welcomed and used theatrical and technological developments. However, when scientific methods bring under scrutiny the exercise of the film arts, the welcome is changed to some degree of rejection.

---


Elsewhere Carpenter, along with his co-worker Greenhill, perhaps best summed up the role that science can serve in the art of designing and producing instructional films. Reflecting on the massive program of research completed by the Instructional Film Research Program at Pennsylvania State College, they concluded that there were four main values of instructional film research:

1. Research helps to define problems in instructional film production rather than to offer ready-made solutions.

2. Research helps to suggest critical areas in instructional film production where decisions must be made rather than to tell what decisions to make.

3. Research helps to provide detailed information about a range of instructional film characteristics and how they affect learning in a variety of situations rather than to tell precisely what film characteristics to use in a given situation.

4. Research helps to point the way to new applications of instructional films, or to emphasize important variables related to the effective utilization of films.\(^8\)

Wagner expressed a similar opinion:

Despite the misgivings of some film practitioners, what has been learned about the effectiveness of various rhetorical elements in instructional film research need not be taken as a formalized pattern, but rather as the basis for a more intelligent approach to film design.9

These comments suggest that research can sometimes provide some useful guidelines which can be skillfully adapted by the creative film maker in specific situations. This view of the utility of research coupled with a similar view in regard to data from two other sources will be followed in this investigation.

The Scientific Nature of the Study

Scientific activity is a language activity. Language is used as a tool to carry the information. Two major language considerations are reliability and validity. According to Schwab, reliability involves the "... extent to which manipulations and measurements indicated by the terms can be undertaken with precision and repeated with uniform consequences." When reliability is stressed, the terms of a research program are relatively free of vagueness and ambiguity. Schwab defined validity as "... the extent to which the terms of a research program approximate the presumptive richness and complexity of the subject matter."10

---

When one maximizes reliability, validity suffers and vice versa. When validity is the main concern, one can settle for less distinctness and ambiguity in order to "... represent as much of the extent and complexity of the subject as the state of the art permits."\textsuperscript{11}

In the present investigation, validity was maximized. It was felt that to explore the richness and complexities of the matter of instructional film design in the manner proposed, some preciseness would have to be sacrificed. However, every effort was made to make the language activity of this study as precise as possible given these considerations.

The Problem

This study will attempt to derive some operational generalizations pertaining to the design of instructional films through an analysis and synthesis of two sources of data. The sources of data to be used are: (1) generalizations from experimental research, and (2) a survey of the opinions of instructional film producers. A third source of data will consist of an analysis of twenty outstanding instructional films. This examination will be used to ascertain the degree of inclusion of the operational generalizations in a sample of films judged to be some of the best instructional films currently available.

\textsuperscript{11} \textit{Ibid.}
Importance of the Study

The novice producer of instructional films has few useful guidelines to follow when designing instructional films. The findings of experimental research and the educated opinion of experienced producers are apparently not available to him in a synthesized, concise form. Goodman reported this situation as early as 1941 when he called for a concentrated effort to contact producers to find out what standards they used in the production of visual materials. No evidence was found in the present study that such an effort was ever made.

Goodman also called for a literature search for applicable research which might be useful to the designer of instructional materials. \(^ {12}\) Nearly twenty years later, in 1960, Hoban found that in terms of producers using research findings to design films, the situation was bleak. He called for an improved network of communication of research findings:

A serious vacuum in educational film research (as in most of educational research) is in the investigation of the network of communication of research findings from investigator to implementer. Film research, like any research, is a production enterprise. The product is information. This information is distributed, partly through the channels and procedures of technical reporting, and partly through the interpersonal grapevine. There is little evidence that film research findings

\(^ {12}\) David J. Goodman, "Criteria for the Production and Selection of Visual Aids," *Education*, LVI, No. 6 (February, 1941), 361.
have reached and influenced the producers or users of films for and in schools and colleges.¹³

Even more recently L. P. Greenhill lamented in Carpenter and Reilly that instructional film research findings were not "... in a form that can be understood and used either by the teachers who prepare and present instruction, or by producers who work with teachers in preparing it."¹⁴ And in 1971, in an excellent overview of the history of all media research, Allen commented that fifty years of research on instructional media had "... resulted in a mass of results still waiting for synthesis and interpretation."¹⁵ Allen also indicated that only with programmed instruction are experimental results being translated into guidelines for the design of materials.¹⁶

In one of the few books devoted specifically to the subject of producing educational films, Herman dismissed the value of the


¹⁶ Ibid., p. 10.
prodigious numbers of research studies that had been completed with these terse comments:

... these studies have been couched in the curious, uncommunicative jargon of the research psychologists. The use of such terms as "analysis of co-variance," "bi-serial correlation," and "variance (SD2)" is a tortured mystique. Certainly, no self-respecting, professional film maker—or film user—could profit from the research findings by producing improved educational films. Written in a style that is rigidly formal, dull, dreary, and boringly pedantic, these film research reports have actually inhibited learning. 17

While the scientific language that Herman deplores is generally necessary for preciseness in reporting research results, there is also a need for reporting to instructional film producers the generalized findings from research plus the expert opinion of film producers in a simple, uncomplicated language. This study will attempt such a reporting activity.

Limitations of the Study

Both Travers and Fleming 18 discussed the problems of translating research generalizations into design guidelines. Such guidelines become removed from the original research situations when applied in a


new setting. However, both Travers and Fleming were referring to basic research. Travers admitted that there is less "slippage" when translating applied research into guidelines for practice. Since this study will review both basic and applied research in an attempt to find areas of agreement and to support the resultant design generalizations with data from two other sources, the opinions of producers and the analysis of outstanding films, there is less danger in establishing operational generalizations as in the case when generalizing from basic research alone.

Nevertheless, even the design element generalizations that may result from this study should not be accepted as firm rules or principles. They will be rather broadly based generalizations that must be accepted as tentative and to be used in the four ways suggested by Carpenter and Greenhill earlier in this chapter.

Kendall had this to say about using research results:

The researchers say, "Research must be complete before it is divulged." Others argue, "But think! Research is never complete. The whole of human progress stands on imperfect knowledge, or incomplete but continuing research."\(^{19}\)

The operational generalizations that are produced in this study have potential as a beginning effort to put the novice instructional film producer in direct contact with present state-of-the-art evidence and thinking.

---

\(^{19}\)Ken Kendall, "Film Production Principles--The Subject of Research," Journal of the SMPTE, LVIII (May, 1952), 429.
Two data collecting methods used in this study, the Delphi Technique and film analyzation by individuals or panels, are far from being refined research methods. Much more experimentation and research are needed in these two areas. However, they both show considerable promise as a means of looking into complex areas.

**Definition of Terms Used in This Study**

**Design.** Dewey made the following observation: "It is significant that the word 'design' has a double meaning. It signifies purpose and it signifies arrangement, mode of composition." The latter part of Dewey's definition of design is used in this study. The design role in film production consists of making a plan or a pattern for production. It serves as a blueprint but "... may take a variety of forms: script, storyboard, layout, synopsis, mock-up, prototype." In the design stages, such elements as the following are considered: use of introductions, summaries, repetition, size comparisons, temporal structuring or ordering of events, the use of color or black-and-white, the use of optical effects, and music.

**Design element.** Frequent reference is made to design elements. The phrase design element is used to refer to each

---


21 Fleming, "Perceptual Principles," p. 73.
individual design consideration, e.g., the use of color in instructional films.

**Production.** The production phase of film making involves the "manufacturing" of the film design or plan. It involves the camera work, processing, editing, sound recording, and final assembly of component parts into a finished product—an instructional film.

**Instructional films.** Instructional films, as used in this study, are films that have had "... a high degree of pre-planning and directional intent ..." aimed at attaining selected and specific goals of instruction and are designed for school audiences as opposed to theatrical, entertainment, or commercial audiences.

It is very difficult to make a distinction between instructional films and educational films. Since education refers to all experiences, both planned and incidental, practically all films could be used for educational purposes and could thus be referred to as "educational" films. However, many broadly "educational" films can be used also for narrowly instructional purposes. In the final analysis, use often determines the classification of a film.

---

The definition of instructional films given at the beginning of this section will be used throughout this study when discussing the design and production of films for use in instructional settings. However, in Chapter V evidence of the conversion of theatrical and entertainment films into instructional films through use will be seen.

Novice film maker. As used in this study, the phrase novice film maker refers to the teacher, audiovisual specialist, student, and other school personnel who are inexperienced in the design and production of instructional films.

Generalization. The term generalization is not used in a strictly scientific sense in this study, i.e., not in the sense that the generalization that is stated approaches a scientific law. As used here, the term refers to statements which summarize pertinent scientific evidence on a specific instructional film design element.

Operational generalization. Operational generalization is a term used by Allen to describe a product of research that is not often achieved. This product would involve the analysis and synthesis of research results and an application of the resulting generalizations to some process or method of productive activity (an operation). In the

---

23 Allen, "Instructional Media Research," p. 11.
present study, operational generalizations are statements about design elements in the instructional film that are based on experimental research, but also on the educated opinions of film producers.

PROCEDURES TO BE USED IN THE STUDY

Two main sources of data will be used in attempting to arrive at some operational generalizations about design elements in instructional films. They are: (1) generalizations drawn from reviews of experimental research in this area, and (2) the opinions of instructional film producers of these research-based generalizations plus other generalizations added by the producers. A third source, an analysis of outstanding films, will be an attempt to determine the degree to which the derived operational generalizations exist in a sample of films judged to be among the best being used for instructional purposes. Evidence of existence will be considered as possible additional support for the operational generalizations. The comprehensive design plan for the entire research project is shown in Figure 1.

Generalizations from Experimental Research

Reviews of experimental research applicable to the design of instructional films will be analyzed. The research to be analyzed spans a number of different fields, e.g., applied film research, perception research, and psychological research. An attempt will be made to
FIGURE 1
DERIVATION OF PRIMARY AND SECONDARY OPERATIONAL GENERALIZATIONS ON DESIGN OF INSTRUCTIONAL FILMS
AND THE ANALYSIS OF 20 INSTRUCTIONAL FILMS JUDGED TO BE OUTSTANDING
arrive at some tentative operational generalizations on instructional film design elements.

Survey of Instructional Film Producers

A group of key persons experienced and knowledgeable in the area of designing instructional films will be selected and surveyed. This survey will include both university production personnel and commercial producers. A modified version of the Delphi Technique will be used as an instrument to progressively arrive at more carefully considered group opinions regarding a number of design elements of instructional films. Finally, a consensus of opinion, along with stated minority opinions, will be derived. The procedure is as follows:

First questionnaire. Design and distribute a questionnaire which lists the tentative operational generalizations obtained from the analysis of the selected research reviews. Relying on his informed intuitive judgment, each respondent will be asked to react to each of these generalizations using as a criterion the degree of importance of each as a design element in making instructional films. The respondent will be encouraged to make additional comments on the subject of designing instructional films.

Second questionnaire. The second questionnaire will include the original list of generalizations, indicate the consensus, and in
effect ask the respondents either to revise their opinions or else to specify reasons for remaining outside the consensus on each generalization. He will also be asked to react to a list of statements on design of instructional films synthesized from additional comments made by respondents.

Third questionnaire. The final questionnaire will include the list of tentative operational generalizations and the statements on film design synthesized from producers' comments. It will indicate the consensus on each generalization and statement, plus list all of the comments and opinions called for in Delphi II. A final chance for revision of opinions will be provided. Included on the third questionnaire will be a question or questions in the following area of concern: Many have stated that the findings of film research do not find their way into film design. The producers will be asked to respond to this predicament and to suggest possible solutions.

Statement of the Primary and Secondary Operational Generalizations

Based on the final results of the survey of producers' opinion of the tentative operational generalizations from experimental research and the producer-generated statements on other design elements (i.e., the results of Delphi Questionnaire III), a strategy will be devised to
categorize these generalizations and statements as primary and secondary operational generalizations.

**Analysis of Outstanding Films**

Instructional films that have been judged as being outstanding will be identified. This will be accomplished by surveying with a questionnaire a selected group of audiovisual directors of large-city school systems. These audiovisual directors will be asked to list from five to eight 16mm titles that they consider to be among the best instructional films that are used in their district. They will be asked to consider feedback received from teachers, their own evaluative judgments, and any other source of information.

The twenty films mentioned most frequently in the survey of the audiovisual directors will then be analyzed in terms of the primary and secondary operational generalizations on design elements produced through the survey of selected research reviews and the film producers' survey. The purpose of this analysis will be to compare the operational generalizations with techniques used in instructional films judged to be outstanding. Substantial evidence of the incorporation of the essence of any of the operational generalizations will be considered as possible additional support of individual generalizations.
SUMMARY

Now that more teachers, students, and other school personnel are making motion pictures for instructional use, it would seem important to make available to them the findings from research and the opinion of experienced film producers on the subject of design of instructional films. This type of information is apparently not available to them in synthesized, concise form. It would be hoped that this information would not be used in a routine, formalized way, but rather as the basis for a more intelligent approach to the design and production of instructional films.

It was proposed to synthesize the products of research and the opinions of university and commercial producers of instructional films into operational generalizations on the design of instructional films. This activity will be discussed in Chapters III and IV. In addition, twenty instructional films judged to be outstanding will be analyzed to determine the degree of inclusion of the essence of these operational generalizations into their design. This analysis will be reported on in Chapter V.
CHAPTER II

REVIEW OF RELATED LITERATURE

The intent of this study was to put the designer of instructional films in closer contact with applicable research results and expert opinion. Since the main target audience was identified as the novice or inexperienced producer of instructional films, the teacher, audiovisual specialist, the student, and other school personnel were the type of people involved. Hence, in this chapter it was appropriate to review the content of the sources of information that this target audience generally used in designing instructional films. In addition, studies related to the present investigation were also reviewed. The chapter is concluded with a discussion of the selected research reviews which were the basis for the tentative operational generalizations on design elements of instructional films.

REVIEW OF SOURCES OF INFORMATION ON FILM DESIGN

An examination of four widely-used audiovisual education textbooks revealed a paucity of specific design guidelines based on research and educated producer opinion. Wittich and Schuler in
Audiovisual Materials: The Nature and Use did not devote any space to the subject of designing or producing instructional films. \(^1\) Erickson in Fundamentals of Teaching with Audiovisual Technology devoted seven pages to the topic of "Preparing Motion Picture Films." This material consisted primarily of a recommended procedural process to use (e.g., outlining, scripting) and technical matters to consider (e.g., hints on camera use, lighting, sound). No research findings on designing instructional films were presented. \(^2\) Brown, Lewis, and Harcleroad in AV Instruction: Media and Methods also devoted seven pages to the topic of producing instructional films. One page considered such general considerations as the stating of the objectives of the film, deciding to use 16mm or 8mm, and whether to use color or black-and-white. There followed several pages of procedural information: preparing the story outline, shooting, editing, titling, try-out, adding sound, and using and evaluating films. \(^3\) Two pages were devoted to "Research about Film Use." In contrast to the two previous sources, Brown, Lewis, and Harcleroad did report a few findings from research.

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reviews, but they dealt with only two areas of design consideration: participation techniques and repetition.\footnote{Ibid., pp. 285-86.} Dale in \textit{Audiovisual Methods in Teaching} devoted five pages to discussing "Principles Governing Film Influence." Only two of these principles dealt with the area of designing instructional films.\footnote{Edgar Dale, \textit{Audiovisual Methods in Teaching} (3rd ed.; New York: Holt, Rinehart, and Winston, 1969), pp. 413-17.} Elsewhere one-half page was devoted to the consideration of teachers producing their own films.\footnote{Ibid., p. 408.}

Among the textbooks devoted to the topic of producing audiovisual materials for instruction, only Kemp's \textit{Planning and Producing Audiovisual Materials} dealt substantially with designing and producing instructional motion picture films. Kemp did an admirable job of detailing the procedure to follow in developing an instructional film—from the idea stage to the completed product. He also made the most concentrated effort to date of calling to the attention of the designer of instructional films a considerable number of research findings.\footnote{Jerrold E. Kemp, \textit{Planning and Producing Audiovisual Materials} (2nd ed.; San Francisco: Chandler Publishing Company, 1968).} He listed findings from reviews by Hoban and van Ormer, May and

\textit{...}
Lumsdaine, May, Travers, Hartman, and Gropper. However, there was no attempt to synthesize these findings into a body of operational generalizations on design.

Through the years Child and Finch (1941), Waldron (1949), Buchanan (1951), Herman (1965), and others have written books which dealt with the subject of designing and producing instructional films.

In recent years books on the general techniques of film production have

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appeared. Among them were books by Mercer and Baddeley. While these six sources are valuable for learning procedural and technical facets of film production, they largely ignore matters bearing on design considerations of an instructional nature.

A review of periodical and reference materials revealed a smattering of information on the findings of film research and their implications for film design. This information was found in publications like the Review of Educational Research, the Journal of the University Film Association, the Journal of the Society of Motion Picture and Television Engineers, and the Annual Review of Psychology. For the most part these sources were reporting on specific research projects such as the Instructional Film Research Program, or were reviewing research on a specific design element, or were treating

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design elements in a brief and encyclopedic fashion. None of these sources would be particularly helpful to a novice film maker. His search through these materials for guidelines for design and production of instructional films would be exhausting and largely unproductive. Furthermore, the novice film maker, as defined in this study, would not be apt to go to these sources for information.

In the types of journals that the novice film maker would consult, specific information was occasionally given, but it was most frequently dealing with procedural matters of production with little attention to design criteria based on research or the collective opinion of experienced instructional film producers. An example of such an article was one by Kemp and Szumski. While not too useful for design considerations, the material on production procedures was more useful than those that have appeared in other widely-read educational journals. In these journals the majority of articles on film production

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have been at the level of a person reporting how he produced his first film.\footnote{15}

In terms of a reporting of the view of producers as to what constitutes good design, there have been individual efforts by Arnspiger, by Wimmer, and by Wagner,\footnote{16} but no evidence was found of any attempt to gather the collective opinion of a group of experienced producers of instructional films.

**REVIEW OF PREVIOUS RELATED STUDIES**

Early attempts to identify or analyze elements of design in instructional films were reported by McClusky (1924), Doane (1935), and O'Connor (1942).\footnote{17} These studies are primarily of historical


interest as they were conducted relatively early in the development of the instructional film. Furthermore, they did not have the benefit of the substantial volume of research dealing with design variables that was completed during the following three decades.

In a more recent study, Harber examined five films selected from the results of a survey of sixty-six California school districts. The survey asked each respondent to indicate those films most requested by teachers and those considered best by audiovisual specialists. From the film examinations Harber made the following generalizations in regard to technical factors and production techniques:

1. A major power of the educational film lies in its ability to present concepts involving motion.

2. In selecting content, careful consideration should be given to which parts of reality will be visually successful.

3. Music should have some relation to the content of a film, rather than being used only as an emotional stimulus.

4. The content of the films analyzed fit into a specific place in the curriculum of California schools.

5. Camera techniques and vocabulary and pictorial levels of the films were geared closely to the learning levels of their intended audiences.
The films analyzed were Mission Life, Rancho Life, Wonders in Your Own Back Yard, Eighteenth Century Life in Williamsburg, Virginia, and Monarch Butterfly.  

In a more comprehensive study, Wagner analyzed twenty-one films that were reported by the Educational Film Library Association as being most used in schools across the nation. The following films were analyzed: Adventures of Bunny Rabbit, Colonial Children, Gray Squirrel, The Loon's Necklace, Autumn on the Farm, Land of Liberty, The River, Common Animals of the Woods, Farm Animals, Preface to Life, Children's Emotions, Over-dependency, America the Beautiful, Angry Boy, Human Reproduction, Learning to Understand Children, Feeling of Hostility, Broader Concept of Method, Brotherhood of Man, Boundary Lines, and Animals Unlimited. Included in this listing were films reported as most used by two separate groups: school children and adult groups.  

Wagner synthesized the results of the film analyses with empirical and experimental evidence to reach the following conclusions with respect to the well-designated educational film:

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19 Wagner, "Design in the Educational Film."
1. Its effect will be proportional to the degree to which it is based on the common interests and needs of the audience for which it is intended.

2. The vocabulary level of the audience should be kept clearly in mind in preparing film narration, but it must be recognized that what is said is seldom as important as what is shown on the screen.

3. The structure of the film should be simple enough to be understood by its intended audience. It should not contain too many different ideas, nor move too fast.

4. The rate at which the commentary is delivered should be between 100 and 130 words per minute.

5. The film may well include an introduction which clearly and succinctly poses the problem, orients the audience, and establishes "set," or a condition of readiness for the presentation.

6. Key ideas may be repeated two to four times for emphasis and reinforcement, but the repetitions should be varied and aesthetically satisfying as well. The summary is also useful as a form of repetition.

7. The running times of classroom films may vary from five to 30 minutes to fit the class period. Within this limit, the major consideration in film length will not be the capacity of a 16mm reel, but the nature of what is said and the best manner of saying it in motion picture form.

8. It should be recognized that the motion picture experience is an active, not a passive one, and that audience involvement in any type of film is a matter of degree. The elements of identification, familiarity, anticipation, participation, and dramatic structure will be built into the film to the degree necessary to bring about that changed behavior and sharing in common which marks successful communication and effective learning.

9. Color, music, sound, animation, optical, and special effects will be used selectively to simplify, amplify, and reinforce the main idea. The possible distractive influence of these factors will be studied. The subliminal effects of these elements will also be recognized and further explored.
10. The educational film will be deliberately designed to promote the finding and testing of meanings. In such films there will be more "forked-road" situations, more use of "open endings," to make the film experience a means of promoting new and better ways of thinking and behaving.  

Miller reviewed 16mm instructional film research findings and identified nine pre-production elements which she felt had been defined by research as being most effective for learning when incorporated into films. They included four primary elements: participation, knowledge of results, redundancy, and attention-directing techniques. The five pre-production elements of a secondary nature were: introduction, organizational outline, review, readability of film commentary, and color as a discriminating cue. The four primary elements identified as elements were where extensive research had been conducted and where there was a general unanimity that they do improve learning when incorporated into the content of a film. The secondary elements identified were from areas of less research and less solid agreement. Furthermore, with the secondary elements the findings were often contradictory and sometimes controversial. Yet, according to Miller, there was a general consensus that a considerable amount of confidence could be placed upon them.  

20Ibid., pp. 241-42.

21Marilyn A. Miller, "An Investigation to Determine the Impact of Selected Findings of 16mm Instructional Film Research on the Design Criteria Incorporated into 16mm Instructional Film" (unpublished Ed.D. dissertation, Boston University, 1970), pp. 31-78.
A film-rating scale was constructed to determine the inclusion or exclusion of eight of these pre-production elements in a sample of fifty most frequently requested elementary school level films from four major libraries. The sample was obtained during the 1967-1968 school year. A ninth element—readability of film commentary—was analyzed separately using the Flesch Reading Ease Formula. Among the findings were the following:

1. Simple descriptive statistics indicated that the primary elements were incorporated more often in the total sample of films than the secondary elements.

2. The producer seemed to be the key factor in determining whether the results of research are incorporated into the design of instructional films for the elementary grades. One producer, represented by thirty films in the sample, incorporated three of the four primary elements to a significant degree: participation (.01), knowledge of results (.01), and redundancy (.05).

3. A highly significant difference (.01) indicated that producers attempt to gear film commentary to the intended audience. The titles of the fifty films used for analysis are listed below:

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22 Ibid., pp. 109-16.
23 Ibid., pp. 202-06.
McVey surmised that there exists a considerable body of experimental research related to the "... comfortable, effective functioning of the human organism in close and distant sustained

24 Ibid., pp. 232-35.
visually centered tasks. He added that no single comprehensive publication existed that would relate these research findings to recommended visual design and presentation practices in the classroom. In tapping this body of research, McVey used an interdisciplinary approach and investigated those areas not usually associated with the visual specialist. These included: environmental design, human factors engineering, architecture, experimental psychology, visual perception, ophthalmology, art, aesthetics and design, and motion picture and television engineering. Research findings were selected from these areas, analyzed, synthesized, and applied to the general tasks of the visual specialist.

McVey concluded his review of research with the statement that:

... the importance of understanding the interrelated nature of the various elements identified as having relevance, loomed as the most important factor in developing a rationale for visual design and presentation practices.

He continued that, while isolating any one factor without considering the resultant effect on the others would be a mistake, there were a number of generalizations developed which appeared to be relatively


26 Ibid., pp. 1-5.

27 Ibid., p. 380.
uniquivocal. The study concluded with a stating of these generalizations. Some of those dealing with design considerations are listed below:

1. Photographic realism in visual displays may not always be desirable or, for that matter, even acceptable. The most efficient mode for the visual presentation of information appears to be the line drawing or cartoon. The superiority of line drawings and cartoons as visual design types may be due in part to the effectiveness of contours in presenting information.

2. Informational displays do not necessarily have to be visual in order to be effective. There are cases where a word either printed, projected or spoken will elicit more of the desired responses than will a picture.

3. The placement of picture captions should compliment the natural search tendencies of the eye.

4. The use of attention-directing devices via animation techniques have proven to be effective tools when employed in instructional films.

5. The combined audiovisual display is superior to either audio or visual alone if the two elements are relevant to each other.

6. The narrative film has been shown to have distinct advantages over the "live" film.

7. Abstract coding is a useful and practical technique for representing objects in visual displays. Employing realism is not always practical nor recommended since differences between items within a single category are frequently too subtle to be portrayed pictorially.

8. Information may be coded by the following methods: color, geometric shape, configuration, size, visual numbers, visual letter, line length, area, dots, angular orientation, brightness, flash rate, and stereo depth.
9. The two most effective methods of coding for most visual tasks are *numeral* (visual numbers) and *color*.

10. Accuracy decreases as the number of coded items increases.

11. A symbol's legibility is a product of a number of interrelationships, the chief contributing factors being: the visual angle subtended at the eye, illumination, brightness contrast, color, exposure time, form shape and dimensions, stroke width, and the resolution of the presentation system.

12. Black letters against a white background require a heavier stroke width than do white letters against a black background. Transilluminated letters require an even lighter stroke. The reason for these differences lies in the psycho-physical process of irradiation.

13. Aside from viewing distance, lighting, etc., there are a number of factors inherent in a symbol's design that affect its ability to be readily seen. These include character style, simplicity, shading, and the amount of space that surrounds its outline.

14. The Lincoln/MITRE MOD X alphanumerics appear to be the most legible upper case style.

15. There has not been enough research on the legibility of lower case letters to support a recommendation for a particular font style.

16. For short statements, labels, etc., only upper-case letters should be used. For extended statements, long captions and text, upper and lower-case letters are recommended.

17. The legibility of a particular stroke width is directly dependent upon existing brightness contrasts between the symbol and its background and the level of ambient illumination.

18. The symbol size (visual angle subtended at the eye) necessary for accurate viewing is determined by a consideration of the following factors: viewing conditions, ambient
illumination, symbol and background brightness, resolution of the display system, viewing distance, and viewing angle.\(^{28}\) McVey cautions the user of any of these concepts to study the context in which they were developed.

Fleming searched the perception research literature that might shed some light on the process of designing instructional materials. His conclusions were stated in the form of principles for the design of instructional materials.\(^{29}\) Some of these principles will be presented in Chapter III. Those principles not listed in Chapter III may be found in Appendix A.

Several efforts were made by May to develop a list of principles to be used in the design and production of demonstration films.\(^{30}\) Rather than looking to research findings as a basis for principles of design, he used theory. The theory selected was the Miller and Dollard theory of learning by imitation.\(^{31}\) The rules or guiding principles suggested are listed in condensed form below:


\(^{29}\) Fleming, "Perceptual Principles."


1. Motivation devices may be built into the film or the teacher will have to be relied upon to provide them.

2. The performance to be filmed should be carefully analyzed and simplified before the picture is planned.

3. The designer should know his audience and the skills they already possess.

4. If the demonstration requires basic skills which cannot be assumed to be possessed by the audience, it is necessary to build the film so that these particular skills stand out clearly.

5. The demonstration to be filmed should be divided into a series of discrete steps. The size of these steps will depend mainly on the assumptions that the designer makes concerning the skills already possessed by the learner.

6. In the film, each step should be separated from the next one by a pause, a fade-out, a statement by the narrator, or some other device. The tempo of the picture should be as slow as possible, but yet hold the attention of the learners. If a step is rather long or complex, some summarizing device should conclude it.

7. Parts and tools used and manipulated should be named, labeled, or numbered.

8. The subjective camera angle should be used, i.e., the model should appear on the screen from the angle that it will be viewed by the learner.
9. Significant cues that are to elicit a response in the learner should be featured by close-ups and by verbal commentary. Guiding commentary and liberal use of questions and answers may be used. The commentary should use only words that the learner will be able to understand.

10. Commentary can be made to be more effective by pausing between each sentence to allow the learner to formulate his own verbal cues, by repeating key sentences, or by indicating and showing the dire consequences that may result from making the wrong responses at critical places.

11. The more difficult steps in the process should be repeated perhaps two or three times, but with variations. May emphasized that although these principles are based on a psychological analysis of learning from a demonstration, their final value depended upon whether the observation of them resulted in films that gave better results in the classroom. While some of the May principles have been tested in experimental situations, many have not. May encouraged future researchers to construct their hypotheses from a theoretical perspective rather than on suggestions from previous

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32 May, "Verbal Responses to Demonstrational Films," pp. 176-78.
experiments or as a result of a hunch or a guess as to the probable influence of some variable on the learning task.  

Sheffield and Maccoby used both theory and research findings to devise a list of principles to be used in constructing films for teaching complex sequences. The research findings that were used were selected from the program of research conducted by the Research and Development Command of the U. S. Air Force between 1950 and 1957. These principles were used to produce a training film on the waste-gate motor assembly. While the experimentation did not yield information on which principles were useful and which were not, the researchers concluded that "... at least the list comprises the policies followed in the preparation of what apparently was a successful filmed demonstration of a mechanical assembly task."  

A condensation of the list of principles that were used follows:

1. The subjective camera angle should be used (scenes should be taken over the shoulder of the demonstrator).

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33 May, "A Look at Learning Theories."

2. All parts should be displayed at the outset and left in the same positions until they are picked up and relocated in the assembly itself.

3. As each part is selected for assembly, it should be displayed by itself while it is being named and described.

4. To help establish a baseline for relative sizes of parts, at each stage of the assembly the structure assembled up to that point should be kept in view as much as possible.

5. The arrangement of a display and the placement of a part for individual inspection should be shown from a view which maximizes the perception of the total form of each individual part.

6. There is often an advantage to showing a complex part from several different angles.

7. A long shot should precede and follow a close-up of any part. This establishes the relative size of the unit compared with the rest of the assembly.

8. Whenever possible each part should be given a name which as nearly as possible describes either some characteristic of the part or some characteristic of its location in the assembly.

9. Place together visually and describe their differences verbally of parts that are similar in appearance but go in different locations in the assembly.
10. A descriptive narrative should precede the visual portrayal of an assembly operation.

11. Name and describe any feature of a part which can serve as a reminder of the nature of an assembly operation or the location of the part in the total structure.

12. Context cues should be used whenever possible. Naming, labeling, and describing can help to distinguish one part from another.\textsuperscript{35}

Several other attempts have been made to incorporate the findings of instructional film research into the production of experimental films. McConkey attempted to develop a method of planning, producing, and evaluating films which provided for the application of research findings and techniques. The method, called the communications method of non-theatrical film production, is designed to accomplish its objectives in these specific ways:

(1) it calls for the use of relevant research findings as aids to film design; (2) it provides for evaluation of actual performance with the sponsor and selected audience members; (3) it calls for analysis and interpretation of results by the producer who (4) makes any modifications in the film which are necessary and feasible; (5) modifies the method if necessary; (6) identifies any findings which may be of subsequent use to himself and to others; and (7) shares his findings with the sponsor to whom he makes recommendations for supplementary materials and other modifications.

\textsuperscript{35}\textit{Ibid.}, pp. 129-31.
in use procedures which may have been indicated by interpretation of the findings. 36

To evaluate this method, the above procedure was used to produce a 16mm film entitled A Second Look. On the basis of the evidence collected from five showings and the administration of four evaluative devices, it was concluded that, in general, the experimental film achieved its objectives; i.e., the film's message was accepted by the sponsor and the target audience. 37

Another attempt to use the findings of film research in designing films was reported by McCoy. In an experiment in the Instructional Film Research Program at Pennsylvania State University, pertinent research findings of the program were incorporated into a series of films on marksmanship. The conclusions reached in this project are reported as follows:

While film research results provide valuable general guidance it was found in practice that most of the decisions that have to be made in film making must still be made for each specific film production. The principal values of the research results we now have are:

1) to clearly define problems rather than to offer ready-made solutions


37 Ibid., pp. 92-96.
2) to suggest critical areas where decisions must be made rather than to tell what decisions to make
3) to provide detailed information about a range of film characteristics and how they affect learning in a variety of situations, rather than to say precisely what film characteristics to use in a given situation.

Thus, film research results act as guide posts and show where to put emphasis, they help to systematize the problems of the film maker, rather than solve them for him.

Film research results must be interpreted and adapted by the film maker to meet the requirements of each specific film production situation. Film makers who are looking for a neat formula which will blueprint the safe and sure method for producing effective instructional films are likely to be disappointed.38

Vandermeer, Morrison, and Smith used a different approach to the subject of improving the design of instructional films. They took two existing teaching films, revised them based on tests that were developed over their content, and then compared the revised and original versions of the films through the use of test data gathered from comparable groups of subjects. Their hypothesis was that:

... systematic revisions of an existing motion picture aimed at correcting weaknesses that appeared to explain the relative lack of teaching effectiveness of certain scenes would improve the overall effectiveness of the film as


The data supported this hypothesis. The following types of revisions were made:

1. Strengthening of the introduction, giving prominence to the organization of the film, and improving the summary.

2. Improving the visibility of that which is intended to be seen (e.g., adding labeling and close-ups).

3. Concept of size—attempt to relate the sizes of objects in films to common objects.

4. Adding attention-directing devices and labels (arrows were used and also labels to identify objects).

5. Using graphics (added tables and charts to summarize information).

6. Showing in the video what the audio refers to (original films did not always do this).

7. Visual verbosity—In original films, audio mentioned items as examples but did not show them. Revisions added visual examples.

8. Changing structure of commentary (move action words to beginning of sentences.)
9. Verbal penuriousness (use fewer words in the commentary, but retain the essence of meaning. Viewer can then spend more time concentrating on the visual).

10. Using direct statements in the commentary versus student inference.

11. Precision phrasing (use words with more precise meaning).

The tests used to judge the increased efficiency of revised film versions attempted to deal with a representative sampling of the curricularly valid information presented in the film. However, some test items did not bear directly on specific revisions of particular scenes or commentary revisions. Hence, it is not possible to say that among the types of revisions used any specific one will necessarily improve a film. But the general effect of all revisions made in each of the two films in this study was to improve efficiency of the film to present information.

The present study differs in several respects from the preceding ones. The first and most significant difference is that none of these studies attempted to survey the opinion of film producers as a source of data on design of instructional films. Several of the studies quoted

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40 Ibid., pp. 10-17.

41 Ibid.
individual producers on matters of design, but no collective opinions were sought. A second difference in methodology was the way in which the research studies were handled. Except in Fleming and his review of the perception research, individual research studies were examined for bearing on design elements of instructional films. The present study dealt only with research reviews. While this technique has the disadvantage of relying heavily on someone else's analytical work, it has the advantage of being able to include a much wider scope of research than would normally be possible. This comment leads to the third difference between this study and the previous ones that were reviewed. Except for McVey, none of these earlier studies attempted to cover such wide and diverse fields of research. Included in the present study are findings from the Army and Navy supported research at Pennsylvania State University between 1947 and 1954, the Air Force film research program between 1950 and 1957, findings from psychological studies as reported by Travers, findings from perceptual research as reviewed by Fleming, findings from film and television research as reviewed by Chu and Schramm, and the multidisciplinary effort by McVey. For the most part, McVey covered fields of research different from those covered in the present study.
REVIEW OF THE SELECTED RESEARCH REVIEWS

In the process of seeking to find research-based generalizations on design elements of instructional films, twenty-four separate research reviews were studied. A bibliographic listing of these reviews can be found in Appendix B. Some of these reviews did not yield clear-cut generalizations or stated generalizations were not identified with specific research studies. There was also duplication of effort, i.e., several reviews covered essentially the same research studies.

Finally, four research reviews were selected as the main sources for obtaining generalizations on the design elements of instructional films. These were Hoban and van Ormer, Carpenter and Greenhill, Travers, and Fleming. In addition, Cook, Hartman, Chu and Schramm, and McVey were used as the basis for about a dozen additional generalizations. These eight sources provided a good

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42 Hoban and van Ormer, Instructional Film Research, 1918-1950; Carpenter and Greenhill, Instructional Film Research Reports; Travers, Audiovisual Information Transmission; Fleming, "Perceptual Principles," pp. 69-200.

coverage of much of the research dealing with design variables in
instructional films. The remainder of this section of Chapter II will
involve a discussion of the nature and scope of each of these research
reviews.

In 1951 Hoban and van Ormer reported the results of their
review of instructional film research which included studies spanning
a period of about thirty years. They concluded each chapter with a
summarization of the findings reported. The Hoban and van Ormer
project was undertaken by the Instructional Film Research Program at
Pennsylvania State University. This program was sponsored by both
the Department of the Army and the Department of the Navy. In their
project, Hoban and van Ormer reviewed studies undertaken as part of
the Instructional Film Research Program as well as many other studies
conducted elsewhere. 44

The Hoban and van Ormer publication was critically reviewed
by Lumsdaine. While indicating that Instructional Film Research 1918-
1950 will probably be the standard historical summary of film research
literature for the first half of the twentieth century, he criticized the
authors for not consistently treating the studies reviewed in a highly
critical manner. Lumsdaine felt that some of the conclusions or

44 Hoban and van Ormer, Instructional Film Research, 1918-
1950.
generalizations stated were not supported by the data. However, in several places he praised the section on "Elements in the Film Affecting Its Influence" (this section—Chapter VIII—was the one used to draw out all but a few of the design element generalizations from Hoban and van Ormer). At one point he stated that in "... comparison with the rest of the book, Chapter VIII provides considerable material of permanent scientific significance." And elsewhere he stated: "The meat of the book, from the standpoint of scientific research on factors governing the effective design and use of instructional films, is mostly in Chapter VIII." He pointed out, however, that even this chapter was not free from defects. However, none of the examples he cited as defects bear directly on the interest area of the present study.

Both Saettler and Allen cited the Hoban and van Ormer study as being the most comprehensive report of media research covering the period prior to 1950. Allen added that: "This report serves as an irreplaceable benchmark from which any subsequent review must take


46 Ibid., p. 182.

47 Ibid., p. 177.

its direction, and it should be in the library of every serious student of AV communication. 49

In 1956 Carpenter and Greenhill summarized the findings of the entire Instructional Film Research Program. Their summaries were based on sixty-five Instructional Film Research Reports (with some reports involving more than one experiment). 50 One of these reports, the Hoban and van Ormer review mentioned above, was included in their summarization, but the bulk of the studies in the Instructional Film Research Program were conducted after its publication.

Oppenheimer critically analyzed the Pennsylvania State University Instructional Film Research Program by applying selected research evaluation criteria to the reported results of the sixty of the sixty-five reports which dealt specifically with instructional films. In regard to the list of summarized findings reported by Carpenter and Greenhill, Oppenheimer concluded that many logically followed from the pertinent studies. Others were ambiguous and contradictory with respect to the referenced studies that were indicated as supporting the summarizations. Except in one case (see Simplification, page 84), any generalized finding which Oppenheimer challenged was not used in the present study as a generalization on design elements.

49 Ibid., p. 116.

50 Carpenter and Greenhill, Instructional Film Research Reports.
Oppenheimer also evaluated each of the sixty motion picture studies comprising the Instructional Film Research Program. To analyze each study, a series of twenty-four evaluation criteria were formulated through polling eight recognized authorities in the field of instructional film research. Oppenheimer's evaluations of each study were carefully considered in evaluating and using the summarized findings (generalizations) as reported by Carpenter and Greenhill. A number of generalizations were not used in this study because the studies on which they were based received a low rating by Oppenheimer. The studies that were used in this study were, with few exceptions, judged by Oppenheimer's instrument to be acceptable for use by instructional film producers. In those few exceptional situations, other studies receiving high ratings counteracted those that were low rated.51

The Instructional Film Research Program was massive in scope. Kendall, after citing that there were seventy people on the project and advisory staffs and over 50,000 people used in the experiments, concluded that the "... number and caliber of learned people connected with the project are formidable indeed."52 Allen, in


52 Kendall, "Film Production Principles," p. 430.
discussing both the Air Force research program and the Instructional Film Research Program, arrived at the following conclusion:

The importance of these military studies should not be underestimated. They constitute virtually the only attempts to approach problems in instructional media with a systematic programatic research effort. They dealt with a number of psychological, production, and utilization variables at a level of sophistication and precision.53

Likewise, Travers spoke favorably about the program:

The studies were developed under the direction of C. R. Carpenter with the help of associate L. P. Greenhill. Other able research workers, many of whom have since become notable in the field, also contributed to the program. The series of studies which they undertook represents the most ambitious attempt yet to develop, on the basis of research, a set of principles which can be used in the design of audiovisual materials.54

The Travers review in 1967 was selected as another source of research generalizations because it was found to be the most comprehensive review of research which yielded generalizations dealing with design elements since the Hoban and van Ormer review. Travers reviewed basic and applied research which dealt with designing instructional materials. The applied research studies reviewed (those utilizing audiovisual materials in instructional settings) were generally those completed after 1950 and, as such, involved little duplication of studies used by Hoban and van Ormer. The basic research studies

54 Travers, Audiovisual Information Transmission, p. 21.
cited by Travers were ones dealing with the transmission of information through auditory and visual channels but using very simple materials in a laboratory setting.\footnote{Ibid., pp. 1-287.}

Some of the conclusions reached by Travers as a result of his basic research are a subject of controversy. This is especially true of his generalizations regarding the merits of multiple versus single channel communication and his view of the unimportance of realism in instructional materials.\footnote{Kenneth Norberg, "Visual Perception Theory and Instructional Communication," \textit{Audio Visual Communication Review}, XIV, No. 3 (Fall, 1966), 301-17; Jerome K. Conway, "Multiple-Sensory Modality Communication and the Problem of Sign Types," \textit{Audio Visual Communication Review}, XV, No. 4 (Winter, 1967), 371-83.} However, there was no evidence found that revealed that his Chapter Two on "Review of the Research in Audiovisual Devices for the Design of Learning Situations" has been subjected to any criticism. In fact, many of the generalizations that he reached in this chapter are very similar to those reached by Lumsdaine, May and Lumsdaine, Smith and Smith, and May.\footnote{Lumsdaine, "Instruments and Media of Instruction," pp. 583-682; May and Lumsdaine, \textit{Learning from Films}; Karl V. Smith and Margaret F. Smith, \textit{Cybernetic Principles of Learning and Educational Design} (New York: Holt, Rinehart and Winston, 1966); May, \textit{Audiovisual Instructional Materials}.} With few exceptions, the generalizations from Travers' work that were used in this study came
Fleming reviewed and analyzed the perception research literature since 1960 in an attempt to generate design principles for instructional materials. The principles that Fleming arrived at were generally a result of a synthesis of conclusions reached by writers of secondary sources on perception (based on their analyses of perception research). A total of sixty-one perceptual principles for the design of instructional materials was the result of the study. In the course of his study Fleming had a perception researcher and several message designers critically review the perceptual principles that he submitted to them. On this basis he felt that the principles thus could be represented as being reasonably tenable and relevant.  

As stated earlier, the four sources discussed above became the main sources of research generalizations on design elements of instructional films. Several other studies were used on a more limited basis to draw on some other research generalizations. Cook's generalizations were used in four instances because (in those cases) he drew upon research studies that were not duplicative of the studies cited in the four main sources used. Cook relied heavily on a series of

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film research studies conducted by the Air Force between 1950 and 1957. Hartman was used in one instance where he stated a generalization which appeared to be well-supported by research. Chu and Schramm, in a publication entitled Learning from Television, What the Research Says, developed sixty propositions from a review of film and television experimental studies. These propositions were the generalizations produced as a result of the review of the research. Four of these generalizations were used in this study. McVey was used in three instances. This review of research was particularly interesting because the generalizations arrived at bearing on the design of instructional materials were based primarily on an interdisciplinary research review. Research was reviewed in such diverse fields as human factors engineering, art, and ophthalmology.

The design element generalizations extracted from the foregoing research reviews and the tentative operational generalizations synthesized therefrom will be reported in Chapter III. A few additional comments may serve to further clarify the nature of the various sources used. The extensive program of instructional film research as reported

60 Hartman, "Single and Multiple Channel Communication."
61 Chu and Schramm, Learning from Television.
62 McVey, "Visual Design and Presentation."
by Hoban and van Ormer and by Carpenter and Greenhill encompassed the period from 1918 to 1954. These studies were mostly of an applied research design and dealt specifically with instructional films. The studies that Cook reviewed were also mainly applied research in nature and dealt almost entirely with using instructional films. The studies reviewed by Chu and Schramm were also applied research and involved the use of instructional films and television in the experiments. Travers reviewed both basic and applied research studies which dealt with the broader process of designing instructional materials. The basic research studies cited were conducted in the field of psychology. Fleming also considered design in its broader contexts, but he looked to the field of perception for research findings that could be applied to the problem of designing instructional materials. He pointed out that most writers in the area of the design of instructional materials have looked to the learning literature with the perception literature being largely ignored. However, Fleming conceded that most of the research was far removed from audiovisual applications, but at least the findings may help point in the right directions. Hartman also reviewed both basic and applied research, but he indicated a preference for using basic research in studying single and multiple channel communication. He was also concerned about the design of all types of instructional materials as opposed to instructional films alone.
As can be deduced from the foregoing, only the reviews by Hoban and van Ormer and Carpenter and Greenhill were restricted to instructional films. As was indicated, the other reviews took a somewhat broader viewpoint. Several points should be made in this regard. Allen observed in the 1960 issue of the Encyclopedia of Educational Research that the "... history of research in educational motion pictures is really the history of research in the field of audio-visual communication; for, until the more recent research in educational TV, the major research effort in AV has been with educational films."\textsuperscript{63}

An examination of the studies included in the eight reviews used in the present study revealed this statement to still be largely true, even though some of the reviews' authors referred to the design of instructional materials as opposed to instructional film design. Furthermore, Lumsdaine argued that the distinctions between mediums such as film, television, and filmstrips are not great in terms of media properties.\textsuperscript{64} Chu and Schramm, in dealing specifically with reviewing film and television studies, concluded also that there appears to be "... little if any difference between the learning from television and learning from film, if the two media are used the same way."\textsuperscript{65}


\textsuperscript{64} Lumsdaine, "Instruments and Media of Instruction," pp. 588-89.

\textsuperscript{65} Chu and Schramm, Learning from Television, pp. 156-57.
reached a similar conclusion: "... film and television can be con­
sidered substantially identical media for many purposes (aside from
such physical properties of grain, color, and screen size, and the
much-talked-about factor of 'immediacy' or suspense of live
television)." Considerations such as these led to the conclusion
that the reviews by Cook, Travers, Fleming, Chu and Schramm, McVey,
and Hartman, while directed toward design considerations for instruc­
tional media in general, would be helpful in identifying research
generalizations that bear on the more specific problem of considering
the design elements of instructional films.

In conclusion, it can be said that the research approach taken
by the various reviewers had a tendency to complement each other, but
they also differed sufficiently to give the resulting synthesis of gener­
alizations a broad base encompassing several disciplines and a variety
of applications.

SUMMARY

A review of the sources of information generally available to
novice designers of instructional films and other media, revealed a
paucity of specific guidelines in concise, easy-to-read-and-apply form.

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66 Lumsdaine and May, "Mass Communication and Educational
Earlier attempts to identify or analyze elements of design in instructional films or other media had been made by McClusky, Doane, O'Connor, Harber, Wagner, Miller, McVey, Fleming, May, Sheffield and Maccoby, McConkey, McCoy, and Vandermeer, Morrison, and Smith.

The present study differed from these in three ways: (1) None of the earlier studies attempted to survey the collective opinions of film producers as a source of data on film design. (2) Except for Fleming, the earlier studies examined individual research studies for bearing on film design while the present study dealt only with research reviews. (3) Except for McVey, none of the earlier studies attempted to cover such wide and diverse fields of research as was true of the present study. For the most part, McVey covered fields of research different from those covered in the present study.

After an extensive search of research reviews that would yield generalizations on the design elements of instructional films, eight were finally selected. These were the reviews of research by Hoban and van Ormer, Carpenter and Greenhill, Travers, Fleming, Cook, Hartman, Chu and Schramm, and McVey. The nature and the scope of these reviews were discussed and analyzed. From these eight reviews, tentative generalizations on instructional film design will be selected. These generalizations will be reported in Chapter III.
CHAPTER III

SYNTHESIS OF GENERALIZATIONS OF EXPERIMENTAL RESEARCH

INTRODUCTION

This chapter will be divided into three sections, each with a number of subheadings. These subheadings (which are individual design elements) have listed under them a number of generalizations based on research. By synthesizing these generalizations, a tentative operational generalization was formulated for each design element.

In arriving at a list of tentative operational generalizations based on experimental research, the following strategy was used. First, the findings on design elements from the Instructional Film Research Program at Pennsylvania State University were used as a starting point. As discussed in Chapter II, the Lumsdaine and Oppenheimer critical reviews of this program were used to eliminate generalizations that were considered unsubstantiated or not based on solid scientific research methodology. The 1951 Hoban and van Ormer generalizations were listed first. Several additional generalizations that were not listed in Hoban and van Ormer were obtained from the summarized findings of the Instructional Film Research Program as
reported by Carpenter and Greenhill in 1956. These two sources became, then, the basis for the initial listing of generalizations on design elements. The second step was to search for other research-based generalizations on each element. These generalizations came primarily from Travers and Fleming, with Cook, Chu and Schramm, Hartman, and McVey being used to a lesser extent.

Every attempt was made to find generalizations that were not based on the same data. Some clarification is in order here. The 1956 review by Carpenter and Greenhill summarized research which is a continuation of the same Instructional Film Research Program in which Hoban and van Ormer were involved. In order for a generalization in the Carpenter and Greenhill report to be included in this study, it had to be based on experimental evidence that was in addition to that used by Hoban and van Ormer in their arriving at generalizations. While the review by Travers is almost exclusively based on research completed since the Hoban and van Ormer study, Travers did use some of the more recent Instructional Film Research Program studies in arriving at generalizations. Whenever this was the case, the generalization by Travers had to be based on additional supporting experimental evidence to be included in this study. The same comment applies for the review generalizations reported by Cook, Chu and Schramm, and Hartman. Some of their generalizations were partially based on experimental studies covered by Travers, Hoban and van Ormer, or by Carpenter and
Greenhill, but to be included in this study, they had to be based on additional studies as well. With Fleming, there was no similar problem. Fleming's principles were based on research in the field of perception. In this regard, the only area where it was felt that duplication might exist was between Fleming and Travers. A check of the sources cited in each case revealed this not to be the case. Also with McVey, a check of the sources used revealed that for the generalizations used there was no duplication of studies used in the other sources. This was probably true because McVey reviewed research which was conducted primarily outside the field of education.

Actually, in spite of the cautious discussion above, generalizations based on some of the same studies proved to be the exception rather than the rule. Furthermore, with the exception of two cases in Hoban and van Ormer, no generalization within any of the sources reviewed was accepted unless it was based on a minimum of two experimental studies. Most of the generalizations were based on a considerably greater number of studies. The two cases in Hoban and van Ormer in which generalizations were based on only one study were: Attention-Gaining Devices, page 75, and Active-Passive Voice, page 82. In each case, however, these generalizations were supported by generalizations cited from other research reviews.

Finally, it should be kept in mind that the generalizations resulting in each case vary in the amount of supporting research, and
that the tentative operational generalization stated after the survey of research generalizations on each design element are sometimes a synthesis of several generalizations and sometimes from very different fields of research.

AUDIENCE INVOLVEMENT ELEMENTS

Selective Perception and Response

On the subject of selective perception and response, Hoban and van Ormer concluded that an "... audience responds selectively to motion pictures, reacting to those things which it finds familiar and significant in the pictorial context in which the action takes place."\(^1\)

Several of Fleming's principles of design can be applied here also:

1. Man is a very selective perceiver. He attends to only a few of the sights, sounds, and smells available to him in his environment at any one time.\(^2\)

2. Selective perception is in part dynamic, i.e., it depends on what the individual has learned about his environment, what he at any moment wants or feels an interest in, and what his general perceptual tendencies are.\(^3\)

\(^1\)Hoban and van Ormer, *Instructional Film Research, 1918-1950*, ch. 9, p. 6.


\(^3\)Ibid., p. 82.
3. The more familiar the message to its audience the more readily it is perceived. Thus, message familiarity increases capacity.\(^4\)

Carpenter and Greenhill, in reporting on studies related to this same general area of concern, concluded that films should be prepared for a specific audience.\(^5\)

From this survey of generalizations derived from research, the following tentative operational generalization was formed: Since viewers perceive and respond selectively to motion pictures, instructional films should be prepared with a specific audience in mind, i.e., the film should accommodate the wants, feelings, interests, experiences, and perceptual tendencies of a well-defined viewer group.

**Participation**

There has been a concern expressed by some that the process of viewing a film is too passive to be optimally effective. In this regard considerable research has been completed which attempted to ascertain the merits of participation or practice during the viewing of a film. Hoban and van Ormer reviewed a number of early studies and concluded that it is "... clear that audience participation, properly used, is effective when it involves practice of the behavior which the

\(^4\)Ibid., p. 150.

\(^5\)Carpenter and Greenhill, *Instructional Film Research Reports*, in preface.
film is intended to influence." He added that to be most effective, participation should be employed after some initial learning has taken place, and in the case of motor skills, the task should not be too complex or the rate of development of the film should not be too rapid to interfere with practice.

Travers has also concluded that "... participation during a film will result, under most conditions of instruction, in increased learning." He added that participation does not have to be overt to be effective. Hoban and van Ormer and Cook supported this latter generalization in saying that mental practice such as visual imagery or silent verbalization is often just about as effective as overt practice. Chu and Schramm made the following generalization based on a review of film and television research: "Practice, whether by overt or covert response, will improve learning from instructional television if the practice is appropriate to the learning tasks, and if practice does not constitute an interference [with the television message]."

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6 Hoban and van Ormer, Instructional Film Research, 1918-1950, ch. 8, p. 32.

7 Travers, Audiovisual Information Transmission, p. 76.

8 Hoban and van Ormer, Instructional Film Research, 1918-1950, ch. 4, p. 9; Cook, "Research in Audio-Visual Communications," p. 98.

9 Chu and Schramm, Learning from Television, p. 181.
The tentative operational generalization derived from these research reviews is that audience participation and/or practice (either overt or covert) during a film presentation can improve learning if it is appropriate to the learning task and if it does not constitute an interference with the film's message.

Reinforcement or Knowledge of Results

Hoban and van Ormer concluded that there is "... experimental evidence that the influence of any motion picture depends to a very great extent on the reinforcing experiences that occur before, after, or during a film showing." As a design element, the concern here was primarily with reinforcement or the supplying of knowledge of results during a film showing.

Reinforcement is one of several participation techniques that were discussed in the previous section. In this regard Travers arrived at the following generalization: "Verbalization of response and the furnishing of knowledge of results appear to be the most effective participation techniques." Cook drawing primarily from the findings of several Air Force experiments, also supported the role of reinforcement in practice:

10 Hoban and van Ormer, Instructional Film Research, 1918-1950, ch. 9, p. 3.

11 Travers, Audiovisual Information Transmission, p. 76.
Supplying the student with knowledge of results about his performance has been a cardinal principle of educational theory for a long time. This tenet receives some support from the findings on audio-visual learning.\textsuperscript{12}

In most of the experiments reviewed on the variable of reinforcement, the technique was to ask questions, then after allowing students time to respond, the correct answers were given.

The tentative operational generalization based on the above is that during a film presentation involving student participation, learning can be improved if a student is supplied with knowledge of results about his performance.

### Subjective Camera

The merits of subjective camera versus objective camera has been investigated in several studies. These studies were limited to situations where films were used to train the subjects to perform a perceptual motor task. Hoban and van Ormer concluded that when an instructional film "... gives its audience a learner's eye view, rather than a bystander's view, more learning is likely to take place."\textsuperscript{13} Carpenter and Greenhill supported Hoban and van Ormer's generalizations

\textsuperscript{12}Cook, "Research in Audio-Visual Communications," p. 98.

\textsuperscript{13}Hoban and van Ormer, \textit{Instructional Film Research, 1918-1950}, ch. 8, p. 32.
when they said: "Show a performance on the screen the way the
learner would see it if he were doing the job himself."\textsuperscript{14}

Based on these conclusions, the following tentative opera­
tional generalization was made: \textbf{The subjective camera view should be
used in training subjects to perform a perceptual motor task, i.e.,
show the performance or demonstration on the screen the way the
learner would see it rather than from the view of a bystander.}

\section*{PICTURE AND SOUND ELEMENTS}

\subsection*{Pictorial and Verbal Presentation}

The question of the comparative effectiveness of pictures and
words led Hoban and van Ormer to say:

The studies comparing the effectiveness of pictorial and
verbal presentation do not give conclusive evidence in favor
of either presentation. Rather, they suggest that the problem
involves the amount of emphasis to be placed on one or the
other presentation. But it is evident that since the motion
picture is primarily a visual medium, it should be used to
portray that material which can be conveyed to best advantage
by visual means.\textsuperscript{15}

Fleming arrived at the following principles dealing with pictures and
words:

\textsuperscript{14}Carpenter and Greenhill, \textit{Instructional Film Research
Reports}, in preface.

\textsuperscript{15}Hoban and van Ormer, \textit{Instructional Film Research,
1918–1950}, ch. 8, p. 33.
1. There is considerable evidence that objects and pictures of objects (line drawings) are better remembered than their names. These results have been found for a variety of learning conditions, including recognition, paired associate, and free recall.

2. In general an effective combination of iconic and digital signs appears to be a pictorial stimulus and a verbal response or label or description.\textsuperscript{16}

Travers also reported that there "... seems to be fairly clear evidence that, in a paired associate task, learning is facilitated by having a picture of an object at the stimulus end of the task rather than the printed name of the object, but there is a disadvantage in having the response task involve picture recognition rather than word recognition."\textsuperscript{17}

Hartman made an interesting observation about picture-word combinations. He stated that the meaning of a pictorial message is "... often ambiguous and subject to personal interpretation. The use of words (printed or spoken) to structure this ambiguity and fixate attention is essential. The picture needs the word as often as the word needs the picture."\textsuperscript{18}

There is no conclusive proof of the superiority of pictorial presentation over verbal presentation or vice versa. There are,

\textsuperscript{16} Fleming, "Perceptual Principles," pp. 139-42.

\textsuperscript{17} Travers, Audiovisual Information Transmission, p. 36.

\textsuperscript{18} Hartman, "Single and Multiple Channel Communication," p. 256.
however, several clues as to the best way to use these two forms of presentation together. These clues are listed below as tentative operational generalizations:

1. A pictorial stimulus and a verbal response or label appears to be the most effective arrangement of pictorial and verbal material.

2. Pictures are often ambiguous without the use of words, i.e., the picture needs the word as often as the word needs the picture.

Pictorial and Auditory Channels

A good deal of attention has been given to the study of the relative effectiveness of pictorial and auditory channels of communication. While some generalizations based on research exist in this area, there are areas of disagreement. Also, few of the generalizations found in the various reviews reinforce one another.

Hoban and van Ormer reviewed several studies and concluded that:

There is some evidence that even films in which the narration appears to contain the greater part of the instructional material, the visual element is almost as effective in communicating the material as the narration, provided the audience has some prior acquaintance with the subject matter. The visual and audio elements have a much greater combined effect than either one alone. The relative contribution of the visual and auditory channels seem to depend
on the particular film, its content, the techniques used, and probably on the characteristics of the learners who view it.\textsuperscript{19}

In regard to the combined effect of visual and audio elements, McVey reached a similar conclusion: "The combined audiovisual display is superior to either audio or visual alone if the two elements are relevant to each other."\textsuperscript{20}

Travers arrived at a conflicting generalization on this subject:

While the studies which are typically quoted in books on audiovisual teaching materials appear to support the position that transmission of the same information through more than one sense modality results in more learning than when only one sense modality is involved, none of these studies involved tests of significance to evaluate the validity of their conclusions and the procedures involved generally showed a grossly inadequate control of the experimental conditions. Studies undertaken at the University of Utah do not support the conclusions of the earlier research workers but are on more solid ground because of the modern laboratory methods and designs which have been used. Our conclusion has to be that there is no evidence to support the position of writers on audiovisual materials that the transmission of redundant information through more than one sense modality produces superior learning.\textsuperscript{21}

Among the reviewers, Travers appeared to be the lone dissenter to the generalization that the combined audiovisual display is superior to either audio or visual alone. His generalization is based primarily on

\begin{flushleft}
\textsuperscript{19}Hoban and van Ormer, \textit{Instructional Film Research, 1918-1950}, ch. 8, p. 35.  \\
\textsuperscript{20}McVey, "Visual Design and Presentation," p. 385.  \\
\textsuperscript{21}Travers, \textit{Audiovisual Information Transmission}, p. 117.  
\end{flushleft}
his own studies at Utah in a laboratory setting which is far removed from the conditions surrounding actual audiovisual practice. Moreover, his review of the literature on this subject included only one of the five studies cited by McVey (all in the 1960's).

In regard to the concern of the use of pictorial versus auditory channels, Travers reached the following conclusions:

The studies on the relative advantages of visual and auditory transmissions of information indicate that each sense modality provides certain advantages. The visual mode has a larger number of codeable dimensions, which are well exploited in teaching aids, and also provide a less ambiguous transmission of information than the auditory. On the other hand, the reception of visual information requires that the receiver make the proper muscular and orienting responses prior to the intake of information. Auditory information is more likely to be received when it is transmitted from a source without warning than is visual.22

Drawing on research in perception, Fleming has formulated some principles of a more specific nature:

1. The perceptual conditions for learning through one modality (vision) will differ importantly from those for another modality (audition), . . .

2. Vision is a sense that is superb for making spatial distinctions but relatively poor for temporal. Audition is a sense that is superb for making temporal distinctions but relatively poor for spatial.

3. If a concept is basically spatial, like mountain, mile, cube, anatomy, leaf shape, big dipper, Venus de Milo, then vision is appropriate. Also where it is desirable to hold a message in the perceptual field of an

22Ibid., p. 116.
audience for some time, then vision is appropriate. Auditory sensations fade rapidly and for critical examination must be presented repeatedly.

4. If a concept is basically temporal—like rhythm or time or sequence or frequency or like poetry or music or speech—then audition is appropriate.

5. If a concept involves both space and time—such as speed, plant growth, life cycles, erosion, city, earth orbit, the westward movement—then both vision and audition can be used. Audition would probably take the form of naming, describing, or calling attention to the spatial changes perceived visually.23

While there was some disagreement among reviewers on the relative effectiveness of the pictorial and auditory channels, it appeared safe to extract these tentative operational generalizations:

1. The visual and audio elements have a greater combined effect than either one alone, provided the two elements are relevant to each other.

2. Vision is best for spatial distinctions (e.g., mountain, mile, cube, and leaf shape), but relatively poor for temporal distinctions.

3. Audition (the sense of hearing) is best for temporal distinctions (e.g., rhythm, time, sequence, frequency, music, or speech), but relatively poor for spatial distinctions.

4. If a concept involves both time and space (e.g., plant growth, life cycles, erosion, city, and the westward movement), use both vision and audition.

5. Vision is a sense that is best when it is desirable to hold a message in the perceptual field of an audience for some time. With audition, repetition is required for critical examination.

6. The visual mode is a less ambiguous mode of transmission than is the auditory.

Attention-Gaining Devices

Some examples of attention-gaining devices are the use of zooms, music, extreme magnification, and stop motion. Hoban and van Ormer generalized that "... attention-gaining devices apparently add little to an otherwise well-made instructional film. Devices which call attention to irrelevant materials may interfere with the learning of more important items." 24 Chu and Schramm, in reviewing television research, reached a conclusion that supported the Hoban and van Ormer generalization. They stated that attention-gaining cues that are "... irrelevant to the subject matter will most probably have a negative effect on learning from instructional television." 25

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24 Hoban and van Ormer, Instructional Film Research, 1918-1950, ch. 8, p. 33.

Fleming, in his list of principles for the design of instructional materials derived from perception research, listed several related to the problem of attention gaining:

1. More generally, man's attention is drawn to what is novel, to whatever stands in contrast to immediate past experience or to lifelong experience.

2. The kinds of stimulus novelty that have been shown to attract attention include color and shape. In visual displays containing several figures of one color or shape, a figure of different color or shape attracted attention.

3. Man's attention is drawn and held by complexity. Given a choice, people have been shown to spend more time looking at--

   a. figures having more numerous elements rather than fewer.
   b. displays having an irregular arrangement of elements.
   c. elements in a group which differ in structure as opposed to being homogeneous.26

Travers, who examined some of the same studies that Fleming used, also emphasized the role that novelty and complexity play upon gaining attention. However, he cautioned that "complex" stimuli used in psychological experiments are generally much simpler than those present in a single frame of a typical instructional film. He concluded that novelty and complexity gain attention primarily because they provide a flow of new information to be processed. He admitted that

even messages that are simple and lacking in novelty can gain and maintain attention provided there is a continuous flow of information.\textsuperscript{27}

The tentative generalizations derived from these reviews of experimental research are that while man's attention is known to be drawn to that which is novel and complex, attention-gaining devices as used in instructional films apparently add little to an otherwise well-made film. Devices which call attention to irrelevant materials may interfere with the learning of more important items.

**Attention-Directing Devices**

Some examples of attention-directing devices are animation techniques, color, close-ups, slow or fast motion, unusual sounds, and the use of selected camera angles. Hoban and van Ormer generalized that "... it seems probable that devices which direct attention to visual elements which may otherwise be overlooked, may serve a useful purpose in facilitating learning."\textsuperscript{28} In regard to a film's commentary, Hoban and van Ormer stated that "... commentary which alerts the audience and orients it to some forthcoming action is preferable in 'how-to-do-it' films to commentary which lags behind the

\textsuperscript{27} Travers, *Audiovisual Information Transmission*, p. 251.

\textsuperscript{28} Hoban and van Ormer, *Instructional Film Research, 1918-1950*, ch. 8, p. 33.
action."⁹ Cook, in reviewing research covered by Hoban and van Ormer plus three additional studies, concluded that an effective audio-visual demonstration, through the use of attention-directing devices, will call attention to relevant parts and let others fade into the background.³⁰ McVey generalized from several recent studies that the use of "... attention-directing devices via animation techniques have proven to be effective tools when employed in instructional films."³¹

A tentative operational generalization drawn from these research reviews is that attention-directing devices may aid learning by calling attention to relevant parts of a visual which may otherwise be overlooked.

**Color**

Hoban and van Ormer made the following observations based on the findings of experiments involving color:

Similarly color appears to have been a distracting influence under some of the conditions studies, possibly because it distracts the learner from more important learning cues. Probably the steps involved in using color most effectively are to determine what the crucial learning cues are, and then to emphasize these cues by the color medium.³²

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³⁰ *Cook, "Research in Audio-Visual Communications,"* p. 95.

³¹ *McVey, "Visual Design and Presentation,"* p. 192.

³² *Hoban and van Ormer, Instructional Film Research, 1918-1950,* ch. 8, p. 33.
Travers, while revealing that children of school age as well as adults generally prefer color films, made the following observation:

The fact that color adds to the attractiveness of a training device does not necessarily mean that it improves learning. Research points to the conclusion that black and white is as effective as color for instructional purposes except when the learning involves an actual color discrimination.33

Chu and Schramm supported the Travers generalization. In reviewing five experimental studies, they concluded that there "... is insufficient evidence to suggest that color will improve learning from film or television."34 McVey, in reviewing research in the area of color outside of education, concluded that when it comes to the subject of color in media design "... criteria other than 'measurable outcomes of learning' are necessary in order to effectively evaluate the contribution that color makes to the learner."35

The tentative generalization derived from these reviews of research is that color in instructional films has not been demonstrated to produce any general over-all increased learning in comparison with black-and-white films, except when the learning involved a color discrimination. Color can in some cases prove to be a distracting

33 Travers, Audiovisual Information Transmission, p. 50.
34 Chu and Schramm, Learning from Television, p. 180.
influence. There is some evidence that color should be used in media design, but the nature of its precise effect can perhaps not be measured in terms of measurable outcomes of learning.

Difficulty of Commentary

Carpenter and Greenhill concluded that the introduction of "... new names or technical terms in a film imposes an additional teaching burden on learners, and may impede the learning of a performance skill."\(^{36}\) Travers, in reviewing studies and evidence on the effect of variations in narration on comprehension, reported that all of the studies indicate that "... verbal simplification procedures applied to film commentaries increase their teaching effectiveness."\(^{37}\) He added that readability formulas can be applied to commentaries to measure their difficulty and they can then be simplified.

The tentative operational generalization reached is that film commentaries should be simplified as much as possible. They should avoid the use of unfamiliar names or technical terms.

\(^{36}\) Carpenter and Greenhill, *Instructional Film Research Reports*, in preface.

\(^{37}\) Travers, *Audiovisual Information Transmission*, p. 60.
Speed of Commentary

Hoban and van Ormer concluded that an "... intermediate amount of talk in the film commentary or narration is more effective than too little or too much talk." 38 Travers, after reviewing the listening comprehension studies, reached a less vague conclusion:

The listening comprehension studies suggest that, if time is not a factor, listening comprehension is likely to be the most effective at speeds of around 160 words a minute. This generalization is probably true only for relatively simple material. The intellectual level of the subjects must also be taken into account. An interesting finding is that when a narration is accompanied by video that the optimum rate of narration appears to be lower. 39

The tentative operational generalization arrived at is that film narrations should be designed as to not have either too little or too much talk. In determining the right amount of talk, the complexity of the material and the intellectual level of the audience must be taken into account. For relatively simple materials, involving narration only, listening comprehension is likely to be most effective at speeds around 160 words a minute. When the narration is accompanied by video, the optimum rate appears to be lower.

38 Hoban and van Ormer, Instructional Film Research, 1918-1950, ch. 8, p. 33.

39 Travers, Audiovisual Information Transmission, p. 60.
Active-Passive Voice

Hoban and van Ormer concluded that direct forms of address (imperative or second person) are generally preferable in instructional films to the third person passive voice. However, the experiment upon which this generalization was based was conducted with a military audience. But Fleming supported the position that the passive voice should not be used. He reported that the "... active form of sentence structure ... is easier to perceive and learn and use in solving problems than is the passive form ...".

The tentative operational generalization is that, in an instructional film's narration, the active form of sentence structure is preferable to the passive form.

Motion

Many film makers have long recognized that motion is often used in films where still pictures would be equally as effective. Some research has been completed which throws some light on this area. Carpenter and Greenhill summarized several pertinent studies in this way: "Filmographs which incorporate still shots rather than motion may

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40 Hoban and van Ormer, *Instructional Film Research, 1918-1950*, ch. 8, p. 33.

be equally effective and less expensive.\textsuperscript{42} Travers, in discussing concept learning and the added problems of processing information which contains irrelevant attributes, concluded that simplification of the

\ldots stimulus array seems justified in all cases except those in which essential information is removed. In many concepts, motion is not a relevant attribute, and it is questionable whether or not motion adds to the learning of such concepts. However, in some concepts such as harmonic motion, the use of moving pictures is necessary to display the essential attributes of the concept.\textsuperscript{43}

Fleming, in discussing his principle that perception of motion is highly related to both temporal and spatial factors, added that even minimal cues can suggest motion. He elaborated as follows:

Motion can be suggested in static figures by blurring or streaking them, and by depicting them in active positions (arms and legs at dynamic angles). An asterisk moving appropriately in a film can be perceived as walking, jumping, or running. And the film medium itself gives an illusion of motion achieved through a succession of static views of objects in different spatial positions, the succession being so rapid that the views cannot be separately distinguished—a clear case of the proper arrangement of spatial and temporal factors.\textsuperscript{44}

A tentative operational generalization resulting from these research generalizations is that in instructional films, still pictures may

\begin{itemize}
  \item \textsuperscript{42} Carpenter and Greenhill, Instructional Film Research Reports, in preface.
  \item \textsuperscript{43} Travers, Audiovisual Information Transmission, p. 219.
  \item \textsuperscript{44} Fleming, "Perceptual Principles," p. 188.
\end{itemize}
sometimes replace the use of moving pictures, and be equally as effective and less expensive.

Simplification

The simplification of the visual image has long been advocated by audiovisual communication specialists. In general, these opinions have some basis in research. Carpenter and Greenhill generalized that films can be made quickly and inexpensively because such elements as color, optical effects, and dramatic effects have not yet demonstrated any substantial increases in learning. While Oppenheimer questioned the design of some of the studies on which this conclusion was based, other reviewers have reported on other research which supported the notion of simplification. Travers wrote at length on the need to simplify audiovisual presentations. He summarized in saying that:

. . . learning situations should be designed in such a way that the relevant features of the visual display are those that are transmitted. This suggests that visual displays used for instructional purposes should exclude all irrelevancies and should be reduced, as far as possible, to the simplest terms. The data from the direct study of audiovisual materials generally supports this contention.

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45 Carpenter and Greenhill, Instructional Film Research Reports, in preface.


47 Travers, Audiovisual Information Transmission, p. 145.
One of Fleming's principles on perceptual capacity seemed to be related here. He said that in general ". . . it can be said that the greater the amount of processing (coding) required for certain information, the less capacity for that and other information, and vice versa, . . . ."\textsuperscript{48}

Based on these research generalizations, the following tentative operational generalization is offered: The visual image should be simplified as much as possible. Only the most relevant and necessary attributes should be included in the image. All irrelevant attributes should be excluded.

FILM STRUCTURE

Rate of Development

Hoban and van Ormer had this to say about the rate of presenting a subject in an instructional film:

The various studies of rate or speed of development in films indicate that when a film containing a large amount of information presents that information to the audience at a rapid rate, the audience learns relatively little from the film. A slower rate of development definitely increases the efficiency of learning from a film.\textsuperscript{49}

The Carpenter and Greenhill review supported this position. They concluded that the ". . . rate of development of a film should be slow

\textsuperscript{48}Fleming, "Perceptual Principles," p. 146.

\textsuperscript{49}Hoban and van Ormer, \textit{Instructional Film Research, 1918–1950}, ch. 8, p. 33.
enough to permit the learners to grasp the material as it is shown.  

These generalized findings appeared to coincide with a conclusion by Fleming. After stating that man is a very selective perceiver that attends to only a small percentage of the sights and sounds available to him at any one time, he added:

Selective perception is in part physical, i.e., each input channel has load limits, and the total information processing capacity from all inputs is limited. The stimulus potential of the environment is great, but the perceiver can attend to only a limited amount at a time.  

Fleming added that the more familiar the message is to its audience, the more readily it is perceived. Thus message familiarity can allow for a greater speed of transmission.

On the topic of each input channel having limits, Travers is in general concurrence with Fleming. Travers added another research generalization which bears on the problem of rate of development. Research findings show that there is a "... decided decrement in immediate memory, shadowing, and rote serial learning when the conditions of the experiment are such that the subject is required to

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50 Carpenter and Greenhill, Instructional Film Research Reports, in preface.
52 Ibid., p. 150.
alternate his attention." He concluded that the implication of this finding is that the rate of development should be decreased at those points at which it is necessary to change attention from one source to another.

The tentative operational generalization arrived at is as follows: Because man is a selective perceiver and is limited in the amount of information he can process, the rate of development of a film should be slow enough to permit him to grasp the material as it is shown. The rate of development should be even slower at points at which it is necessary for the viewer to change attention from one source to another.

Introductions and Summaries

In reviewing research completed dealing with the impact of introductions and summaries on learning, Hoban and van Ormer reached the following conclusion:

The studies cited present some evidence that introductory and summary material may increase the amount of learning from films. However, there were no large learning gains to support this conclusion, due partly to the instructional shortcomings of the films used.  


55 Hoban and van Ormer, *Instructional Film Research, 1918-1950*, ch. 8, p. 33.
One of Fleming's perceptual principles supported Hoban and van Ormer's findings: "The first and last parts of a message tend to be perceived and learned better than the middle. These effects are called primacy and recency." Fleming went on to point out that this should serve to remind the designer that introductions alert the audience as to what to expect and thereby direct attention to relevant features. Summaries serve to restate and re-emphasize the main points.

Cook points out that while some experiments on introductory sequences have been contradictory, the findings nevertheless indicate that at least one tentative conclusion can be reached:

... introductions are more likely to be helpful if they are specific to the learning task, that is, if they familiarize the audience with some aspect of the task to be learned; if they preview the material and thus provide the audience with an additional practice trial; or if they provide an opportunity to learn important cues that will later guide performance during the learning of the task.

The tentative operational generalization to be stated is that introductory and summary material in a film may increase the amount of learning. The main function of introductions is to alert the audience as to what to expect and to thereby direct attention to relevant features. Summaries serve to restate and re-emphasize the main points.

57 Ibid.
58 Cook, "Research in Audio-Visual Communications," p. 94.
Repetition

Hoban and van Ormer concluded that the "evidence comparing the amount of learning resulting from repeating certain sequences within a film shows that some repetition definitely increases the teaching and training effectiveness of a film." 59 After reviewing additional studies conducted in this area, Carpenter and Greenhill supported the Hoban and van Ormer generalization with this statement: "Organize a film so that important sequences or concepts are repeated."60

Fleming, in stating the principle that the "... perceptions of one individual or group may vary markedly from that of another in the same situation, ..."61 went on to point out that the designer might be wise to build redundancy into messages so that most cognitive types will, hopefully, be accommodated. He suggested that this could be done by depicting the same idea in several ways. 62

The tentative operational generalization synthesized from these reviews is that the effectiveness of a film can be improved by organizing

59 Hoban and van Ormer, Instructional Film Research, 1918-1950, ch. 8, p. 33.
60 Carpenter and Greenhill, Instructional Film Research Reports, in preface.
62 Ibid., p. 93.
it so that important sequences or concepts are repeated by depicting the same idea in several ways.

SUMMARY

The strategy was outlined that was used to select generalizations from reviews of experimental research which dealt with design elements of instructional films. Areas of research were identified where there appeared to have been substantial effort and there was a fairly high level of consensus about the results. These areas were designated as design elements. The discussion of each design element was concluded with a stating of a tentative operational generalization.

Through the use of the Delphi Technique these tentative operational generalizations will be submitted to a group of experienced film producers to obtain their reactions and opinions. The methodology used in this Delphi survey and the results obtained will be presented in Chapter IV.
CHAPTER IV

SURVEY OF OPINION OF INSTRUCTIONAL FILM PRODUCERS

INTRODUCTION

The tentative operational generalizations synthesized from experimental research as reported in Chapter III together with some general headings of other areas where research was inconclusive were submitted to a panel of selected instructional film producers for reaction and evaluation. This chapter will deal with the selection of the panel of instructional film producers, the process and instrumentation through which the panel evaluated or rated the tentative operational generalizations based on research and those producer-generated from the above-mentioned areas where research was inconclusive, and a reporting and discussion of the results of the panel survey. This will culminate in the statement of the primary and secondary operational generalizations at the end of the chapter.

SELECTION OF INSTRUCTIONAL FILM PRODUCERS

Dr. Robert W. Wagner, Chairman of the Department of Photography and Cinema at Ohio State University, and a recognized authority
on instructional motion pictures, was asked in an interview to list some of the key persons involved in university film production in the United States. Dr. Wagner listed 17 names. These 17 individuals were asked in a questionnaire (see Appendix C) to list the names of individuals in university and commercial film production whom they considered to be among the most experienced and knowledgeable in the area of designing instructional films. Fifteen of 17, or 88 percent, responded to the questionnaire.

These 15 individuals listed 55 different university and 35 different commercial producers of instructional films. It was decided to survey the opinion of only those producers who were mentioned at least three times. The resulting panel was composed of 11 university producers and 5 commercial producers, for a total of 16. Seven of the final 16 panelists were mentioned by 5 or more of the 15 respondents to the questionnaire.

The 16 panelists represented affiliation with 10 major university film production units, with 1 state department of education film production unit, and with 5 of the largest commercial companies producing instructional films.

SELECTION OF SURVEY METHOD

The Delphi Technique was selected to survey the opinion of the panel of film producers on the subject of the design of instructional
films. This technique was originally developed twenty years ago at the RAND Corporation by Olaf Helmer and his associates, but it was only eight years ago that it was released for use by other organizations. Today hundreds of corporations and a few educational institutions are experimenting with its use.

Delphi is a method of arriving at consensus without bringing the experts or participants together face-to-face. Numerous writers have concluded that meetings and conferences are frequently ineffective ways of arriving at rational decisions. It is theorized that professional status and position often interfere with consensus formulation in group deliberations. With the Delphi Technique, each person is consulted individually through successive rounds of questionnaires. The intent is to progressively arrive at more carefully considered group opinions. Finally, a consensus of opinion, or at least a majority and minority opinion, is derived.

While the Delphi Technique was originally designed to be used in forecasting future events, it has been used by educational institutions to consider needed reforms and innovation, to develop the curriculum

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for a new branch campus,\textsuperscript{3} to collect data for changing a teacher
education program, and to collect data for changing a county school
district.\textsuperscript{4}

In undertaking the present study, since it was obviously not
financially feasible to assemble the panelists in a conference or even
to interview them individually, the Delphi Technique appeared to be a
promising substitute. The technique does force the participant to
consider individual items more carefully than does the single question­
naire method. It also produces an interesting and informative series of
comments and dissenting opinions on each questionnaire item which are
not generally produced by the single questionnaire method.

ADMINISTRATION OF THE SURVEY

The Delphi Technique used in this study was a modified form
of the original Delphi surveys which were used for forecasting of future
events. As a modification, it was similar to the Delphi study conducted
by Cyphert and Gant. They attempted to develop a list of priority targets
for the concentration of energies and resources of the School of

\textsuperscript{3}Robert C. Judd, "Delphi Method: Computerized 'Oracle'
Accelerates Consensus Formation," \textit{College and University Business},
XLIX (September, 1970), 30.

\textsuperscript{4}W. Timothy Weaver, "The Delphi Forecasting Method,"
Education of the University of Virginia. The present study was strongly influenced by the methods used by Cyphert and Gant.

The Delphi Technique used in the present study was administered during the 1971-1972 school year. Copies of the three Delphi questionnaires are included in Appendix D. The conduct of this study is described below.

Delphi Questionnaire I

The list of tentative operational generalizations from experimental research were incorporated into Part A of the first Delphi. The participants were asked to react to each generalization as it would apply in the majority of cases to the design of instructional films. They were to indicate their agreement or disagreement with each statement by checking either agree or disagree. Part B contained a listing of general headings of areas where research was inconclusive but which are often considered when designing instructional films. Rather than indicating agreement or disagreement, the participants were asked to make a short comment about how they felt in regard to each of these areas of design consideration. In addition, they were invited to list any

other factors that they felt were important for the novice film maker to know in designing instructional films.

Fifteen of 16, or 94 percent, of the panel responded to Delphi Questionnaire I. The results of Part A are reported in Table 1. There was consensus agreement with all statements except for one (number 13a). The comments on other design considerations made in Part B are listed in Appendix E.

Delphi Questionnaire II

Part A of Delphi II was a duplicate of Part A of Delphi Questionnaire I except that for each statement on Delphi II there is an indication of the consensus of the group who completed the first questionnaire and an indication to each participant as to whether or not they were outside the consensus. Consensus was defined as the majority of opinion (the number larger than half the total). The participants were asked to reconsider their responses to those items on which they were not in general agreement with others who participated in the study. They were instructed that if they wished to remain outside of the consensus on any item to briefly indicate their primary reason for dissenting.

Part B of Delphi II was handled somewhat differently. The comments on areas of other design considerations made in Part B of Delphi I were synthesized into a list of statements on the subject of the
TABLE 1
RESPONSES TO STATEMENTS OF DELPHI I, PART A

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<tr>
<th>Statement Number</th>
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<th>Participants Disagreeing</th>
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*One individual chose to participate in Part B only. Hence in Part A, he was tallied as making no response.
design of instructional films. This list of statements was presented to the participants in Part B of Delphi II. They were asked to react to each statement and indicate their agreement or disagreement. For those statements with which they disagreed, they were also asked to give reasons for their disagreement.

Delphi Questionnaire II was mailed to the 15 individuals who responded to Delphi I. Fourteen of the 15, or 93 percent, responded. The results of Part A are reported in Table 2. As in Part A of Delphi I, the consensus agreed with all statements except for one (number 13a). In Part B, there was consensus agreement on all statements except for four (numbers 1b, 9, 11, and 13b). The results of Part B are reported in Table 3.

Delphi Questionnaire III

The statements listed in Parts A and B of Delphi Questionnaire III were duplicates of the statements listed in Parts A and B of Delphi II. However, a few statements in Part B were modified slightly based on comments received from participants in the previous questionnaire. As in Delphi II an indication was made for each statement of the consensus of the entire group who completed the questionnaire and an indication was made to each participant as to whether or not they were outside the consensus. In addition, the participants were furnished with a complete listing of comments and opinions for each individual statement that were
**TABLE 2**

RESPONSES TO STATEMENTS OF DELPHI II, PART A

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*One individual chose to participate in Part B only. Hence in Part A, he was tallied as making no response.
### TABLE 3
RESPONSES TO STATEMENTS OF DELPHI II, PART B

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made by respondents to Delphi II (see Appendix F). The purpose of the final step in the Delphi process was to provide each participant with the opportunity of rating each statement with the knowledge of both the consensus rating and the comments and opinions of others involved in the survey.

Delphi III included a Part C. The purpose of Part C was to obtain the general reaction of each participant to (1) the comments of a number of writers on the methods used in arriving at decisions in regard to the design of instructional films, (2) several questions relating to why film research findings do not find their way into film design, and (3) a request for each participant to comment on the substance or process of the entire Delphi process.

Delphi III was mailed to the 14 individuals who responded to Delphi II. All 14 responded. The results of Part A are reported in Table 4 and the results of Part B are found in Table 5. As in Part A of Delphi's I and II, the consensus agreed with all statements except for number 13a. In Part B, there was consensus agreement on all statements except for the same four cited in the results of Delphi II. These four were numbers 1b, 9, 11, and 13b.

In Part C of Delphi III the participants were asked for their general reaction to the comments of a number of writers on the methods used in arriving at decisions in regard to the design of instructional films. The comments of these writers are reproduced below:
### TABLE 4

RESPONSES TO STATEMENTS OF DELPHI III, PART A

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<th>Statement Number</th>
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*One individual chose to participate in Part B only. Hence, in Part A, he was tallied as making no response.
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William H. Allen, 1959: "It is one thing to isolate certain variables under experimental laboratory conditions, yet quite another to get them incorporated by commercial producers into the media themselves."6

Charles F. Hoban, 1960: "There is little evidence that film research findings have reached and influenced the producers or users of films for and in schools and colleges."7

A. A. Lumsdaine, 1963: "Often the content and sequencing of instructional films are governed as much by practices and traditions borrowed from the field of theatrical motion pictures as by considerations of pedagogy."8

Robert W. Wagner, 1966: In discussing educational films in the 1960's Wagner stated that "... more films were being made than ever before, but rarely were they the products of research. Rather, they were, for the most part, based on the same kind of intuitive judgments as before, reinforced by a new interest in the medium by subject matter specialists and by younger, fresher, and for the most part, more imaginative film makers."9

Robert M. W. Travers, 1967: After interviewing four major producers of instructional films and viewing selected films, he concluded that "... in producing an instructional movie, decisions are made in terms of hunches and intuition rather than in terms of a set well-defined production principles."10

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7 Hoban, "Residue of Educational Film Research," p. 100.

8 Lumsdaine, "Instruments and Media of Instruction," p. 588.


10 Travers, *Audiovisual Information Transmission*, p. 11.
William H. Allen, 1971: Allen discussed the importance of the military film research programs (the Penn State-Army and Navy program and the Air Force program), but pointed out that none of the results have been incorporated into the instructional films produced by the military services or by the commercial producers.11

Each participant was then asked to respond to several questions. The first area of inquiry was: "What is your general reaction to these statements? Are they true? Accurate? Disturbing?" The participants' responses are listed below:

1. "I agree that research findings are not being used in the production of instructional films. Part of this is because of the film maker. Part is because the research findings seem to come out as an oversimplified set of rules. In actuality, taking the findings as guides and applying them in an innovative way can produce a new level of instructional film. Penn State did this with the Ambandos/McCoy training series on the M-1 rifle. However, I have no knowledge that the Army ever used the series in day-to-day training."

2. "They are probably true and fairly accurate. But they are not nearly as disturbing as you would imply. Cold, hard, dry research leads to cold, hard, dry films. Hunches and theatrical techniques may just be what American schools need today."

3. "Only partly correct. I feel that a survey of teaching films would find a substantial, but minority of film makers who have incorporated the findings of methods' research into their work. I know that I do apply this material when relevant."

4. "These statements are generally true for film making as for other art forms. Unfortunately, most research in this area always seems to lag behind the innovations in filmmaking which are influencing today's audiences, so by the time the research gets out, the film maker and his audience have moved off to some other level of interest and sophistication."

5. "I believe the ideas expressed above are true in most cases. It is difficult for a producer to apply general research findings to his specific project because of the other pressures applied upon the film designer such as budget, deadlines, personality conflicts, client influences, and talent capabilities. A well-read producer may know what the design ought to be but is unable to carry out these research findings."

6. "Generally true. Not disturbing. Film is a multiple-variable medium which does those things best which are 'non-programmed' and which are always somewhat in the affective domain."

"Good 'hunches' or 'intuition' are the product of experience (i.e., empirical research), so that good educational film producers never work in the dark, are usually cognizant of research, and like good teachers, will always try to put theory into practice."

7. "In the main the statements are valid and I believe that the reluctance of producers to use the results of 'research' in their films is because of their distrust of research in general. They'd rather follow their own hunches which are at least familiar and comfortable than the suggestions of unknown (and probably unreasonable) 'scientists.' Thus what is needed is a popularization of research findings—or a series of statements by successful film producers that they indeed utilized research findings and found them profitable."

8. "I feel they are generally true. I am disturbed in the fact that so much effort (particularly structured research programs) has gone with so little apparent effect."

9. "Somewhat outdated by recent developments and trends in production style. Agree with Wagner. To Bill Allen's (1971) remark, it may be because the creator and the pedantic scholar talk two different, incomprehensible languages."

10. "What is truth? I once heard Art Lumsdaine make a comment to the effect that researchers are always working behind the creators of films. In other words, that new ideas must be thought up before researchers could find out whether they worked. But research has its undeniable value. And I do believe that many of the results of research have indeed found their way into the mainstream. For example, Bob Wagner once said that fades and dissolves did not add to learning. Today's style of filmmaking..."
favors the straight cut over optical effects. But Wagner's research had little to do with effecting the change."

11. "The statements are part-truths, therefore dangerous. As an example, in my 27 years of film-making for education, I have never done or managed a film or filmstrip program that was not researched and judged against the objectives. I am modest enough to believe that my experience is not unique. The difficulty lies in the definition of terms. Most people who now influence educational film research are victims of their own past. Theories must be revised to meet the greater visual literacy of the newest generation of viewers. We need a new generation of theoreticians raised in the visual era. New questions need to be asked--questions I missed seeing in this research. I conclude that I found the above statements disturbing because they are out-of-tune with the times and the facts."


A second question was in two parts, with the first part being:

"If you agree that it is true that the findings of film research do not find their way into film design, what do you think are some of the reasons for this situation?" The participants' responses were:

1. "Let's face it--a considerable body of film research is trivial and filmmakers have to deal with the marketplace."

2. a. "A skepticism of many of the results, e.g., I appreciate the problems of experimental design in this field, but as a fugitive from the physical sciences, many of the assumptions made in design in this field seem to reflect convenience or rationalization. Apart from that, the number of variables is staggering."

b. "A tendency for the 'aesthetic' to repudiate the 'communicator'; to feel that film as an art form cannot lend itself to empirical categorization and description, etc., etc.--"

c. "Most producers don't read research reports--even abstracts of research reports."
3. "Many researchers do not make films and film makers do not read the research. Personalities differ in their approach to the problems of instructional film. Some producers are apathetic, ignorant of research findings or influenced by stronger subject matter pressures."

4. "Too many film makers are consciously or unconsciously trying to imitate the entertainment film in the instructional context—simply because that is where the jobs are—and they have not raised their level of awareness and self-understanding to the point where they can see their task for what it really is—a creative problem requiring methods generally outside those adopted by the entertainment world."

5. a. "Lack of respect for 'professional educators.'"
   b. "Lack of communication between researchers and producers, or more important, school teachers and kids and producers."

6. "Most of the research is based on didactic material. Most of the newer materials use imagination."

7. Four participants indicated that they had covered this question in their response to the previous question. Those involved are numbers 4, 5, 7, and 9 on pages 105 and 106.

   The second part of question two was as follows: "If you agree that it is true that the findings of film research do not find their way into film design, can you suggest any possible solutions for this situation?"

   The participants' responses were:

   1. a. "Many (most?) educational film makers do not understand the research findings. Thus they cannot apply them. Thus they need to discover their previous misunderstandings on this subject, clear up their misunderstandings, learn what research has found to help them, and experiment with applying it."

   b. "Film makers, like everyone else, need to understand themselves deeply and free themselves from the conditioned response patterns they have acquired—so as to be able to truly..."
see their tasks and opportunities clearly, and be free to creatively solve the true problems before them."

2. "Perhaps the new generation of film makers, who are increasingly coming from film school backgrounds, will be more appreciative of the potential role that research can play."

3. "Distribute findings in 'easy-to-read' form to producers, production teachers, and students. Research reports are too often published in 'research' journals which are not available (or read) by film production personnel."

4. "Try to get summarization of research efforts (preferably not a set of abstracts, but a semi-popular style of descriptive material) in the 'medium' magazines (as opposed to the professional journals). Many people keep up with current research, but often they are more involved in teaching than in production design. An alternative approach might involve presentations at various conferences of producers, but keyed to a practical approach. Initially, it will take a selling job--("Why bother with all this crap when you can still sell the films?")"

5. "Have the film makers themselves engage in research, once they are aware that some of their problems can be dealt with in that manner. We are doing this with our advanced production students."

6. "Create a market which demands films based on research findings. Otherwise you are wasting your time."

7. "Let a computer make an instructional film. Then let me go back to work."

Also, in Part C of Delphi III participants were invited to comment on either the substance or the process used in this Delphi survey. Only four of the participants made comments. These comments are listed below.

1. "Good luck!"

2. "Thank you for allowing me to participate."
3. "I'll be interested in hearing (seeing?) what you think you found out."

4. "Even though I have been slow in responding, I have found this to be an educational experience. This looks like a useful method for getting at workable approximations, and defining approaches to problems."

ANALYSIS OF RESULTS

Responses to the questions in Parts A and B of the three Delphi's are summarized in Tables 6 and 7. As it can be seen, there was no change in the relative consensus position established in Delphi I (i.e., there was no change from agree to disagree or vice versa in the subsequent Delphi rounds). However, there were some between-Delphi shifts in the evaluating of each statement. Discounting Delphi I (where the total number was 15 rather than 14 in the case of Delphi's II and III), there were no between-Delphi shifts in Part A for 16 of 30 statements or in Part B for 16 of 30 statements. Except with 7 statements (numbers 9, 11, 13a, and 17b of Part A, and 11, 12d, and 13b of Part B), between-Delphi shifting was very slight—two or less from Delphi I through Delphi III.

The largest shifts occurred on statements 11 and 13b of Part B from Delphi II to Delphi III. With both statements, the change was from 6 agreeing, 7 disagreeing, and 1 not responding to 2 agreeing and 12 disagreeing. This may lead one to believe that the supplying of comments on each item with Delphi III does have an effect on the
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</table>
decision-making process. However, additional research would be needed to verify this.

In analyzing the comments made in Part C of Delphi III, 10 of 14 respondents indicated that the statements were generally true and/or accurate. Two respondents indicated that they were disturbed by the statements while two others indicated the opposite feeling. To the question asking the participants to give reasons why research findings do not find their way into film design, the following is a summarization of their responses:

1. Much of the research is trivial.
2. There is a skepticism of the results of research.
3. Film is more of an art than a science.
4. Most producers don't read research reports.
5. Many are using as a model the techniques used to make entertainment films.
6. Lack of communication between researchers and producers and between school teachers and producers.
7. Most of the research is based on didactic material while most of the newer materials deal with affective domain.
8. Research lags behind the practice. When it reaches the practice, it is no longer helpful because in the meantime the practice has changed.
9. Pressures of budget, deadlines, personality conflicts, client influences, and talent capabilities often make it difficult for a producer to apply research findings.
To the invitation to offer possible solutions to the problem of film research not finding its way into film design, the following is a summarization of the comments made:

1. There is a need to find ways to help the producer better understand research findings by distributing them in easy-to-read form in magazines dealing with the medium or by presenting them at conferences of producers.

2. Have the film makers themselves engage in research.

3. Create a market which demands films based on research.

THE STATING OF PRIMARY AND SECONDARY OPERATIONAL GENERALIZATIONS

It was decided to divide the list of statements found in Parts A and B of the final Delphi round into primary and secondary operational generalizations on film design. This was in accordance with the research design as shown in the flow chart on page 16. The strategy used was to consider as primary operational generalizations all statements in Part A (generalizations based on research) upon which participants in the three Delphi's agreed. Statements upon which they disagreed (only statement number 13a) were assigned a status of a secondary operational generalization. Regardless of the fact that the majority of the participants disagreed with it, a body of research still supported it. The rest of the secondary operational generalizations came from Part B of Delphi III. This included all statements upon which the
participants agreed. Those upon which they disagreed were dropped from the study (statements 1b, 9, 11, and 13b). The statement that the use of negative examples can be effective if a carefully prepared discussion follows the film (see item 12b of Delphi III) was deleted at this point because it was decided that it was not a design element. The rationale behind the listing of these statements as secondary operational generalizations was the fact that while they were statements upon which the majority of the participants agreed, they were not supported by research to the extent that the statements in Part A were.

As a result of this strategy, the following is a listing of the primary and secondary operational generalizations:

**Primary Operational Generalizations**

1. Since viewers perceive and respond selectively to motion pictures, instructional films should be prepared with a specific audience in mind, i.e., the film should accommodate the wants, feelings, interests, experiences, and perceptual tendencies of a well-defined viewer group.

2. Audience participation and/or practice (either overt or covert) during a film presentation can improve learning if it is appropriate to the learning task and if it does not constitute an interference with the film's message.

3. During a film presentation involving student participation, learning can be improved if a student is supplied with a knowledge of results about his performance.

4. The subjective camera view should be used in training subjects to perform a perceptual motor task, i.e., show a performance or demonstration on the screen the way the learner would see it rather than from the view of a bystander.
5. A pictorial stimulus and a verbal response or label appears to be the most effective arrangement of pictorial and verbal material.

6. Pictures are often ambiguous without the use of words, i.e., the picture needs the word as often as the word needs the picture.

7. The visual and audio elements have a greater combined effect than either one alone, provided the two elements are relevant to each other.

8. Vision is a sense that is best for spatial distinctions (e.g., mountain, mile, cube, and leaf shape), but relatively poor for temporal distinctions.

9. Audition (the sense of hearing) is best for temporal distinctions (e.g., rhythm, sequence, frequency, music, or speech), but relatively poor for spatial distinctions.

10. If a concept involves both time and space (e.g., plant growth, life cycles, erosion, city, and the westward movement), use both vision and audition.

11. Vision is a sense that is best when it is desirable to hold a message in the perceptual field of an audience for some time. With audition, repetition is required for critical examination.

12. The visual mode is a less ambiguous mode of transmission than is the auditory.

13. Attention-gaining devices which call attention to irrelevant materials may interfere with the learning of more important items.

14. Attention-directing devices (e.g., animation techniques, color, close-ups, slow or fast motion, unusual sounds, and the use of selected camera angles) may aid learning by calling attention to relevant parts of a visual which may otherwise be overlooked.

15. Color:

   a. Color in instructional films has not been demonstrated to produce any general over-all increased learning in comparison
with black-and-white films, except when the learning involved a color discrimination.

b. Color can in some cases prove to be a distracting influence.

c. There is some evidence that color should be used in media design, but the nature of its precise effect can, perhaps, not be assessed in terms of measurable outcomes of learning.

16. Film Commentaries:

a. Film commentaries should be simplified as much as possible.

b. The commentary should avoid the use of unfamiliar names or technical terms.

17. Film Narrations:

a. Film narrations should be designed so as to not have either too little or too much talk. In determining the right amount of talk, complexity of the material and the intellectual level of the audience must be taken into account.

b. For relatively simple materials involving narration only, listening comprehension is likely to be most effective at speeds around 160 words a minute. When the narration is accompanied by video, the optimum rate appears to be lower.

18. In the narration of an instructional film, the active form of sentence structure is preferable to the passive form.

19. In instructional films, still pictures may sometimes replace the use of moving pictures, and be equally as effective and less expensive.

20. The visual image should be simplified as much as possible. Only the most relevant and necessary attributes should be included in the image. All irrelevant attributes should be excluded.

21. Rate of Development:

a. Because man is a selective perceiver and is limited in the amount of information he can process, the rate of
development of a film should be slow enough to permit him to grasp the material as it is shown.

b. The rate of development should be even slower at points at which it is necessary for the viewer to change attention from one source to another.

22. Introductions and Summaries:

a. Introductory and summary material in a film may increase the amount of learning.

b. The main function of introductions is to alert the audience as to what to expect and to thereby direct attention to relevant features. Summaries serve to restate and re-emphasize the main points.

23. The effectiveness of a film can be improved by organizing it so that important sequences or concepts are repeated by depicting the same idea in several ways.

Secondary Operational Generalizations

1. While man's attention is known to be drawn to that which is novel and complex, attention-gaining devices as used in instructional films apparently add little to an otherwise well-made film. (Some examples are zooms, music, extreme magnification, and stop motion.)

2. Optical effects (fades, dissolves) contribute little to the informational content of an instructional film, . . .

a. . . . but they can serve as a form of punctuation . . .

b. . . . and can make an aesthetic contribution to a film.

3. In instructional films dealing with content which involves the affective domain (learning dealing with feeling states associated with attitudes, values, and appreciations), the main contribution of music is to help establish the mood and pace.
4. Other than the contribution cited in the previous statement, music generally adds little to the informational content of an instructional film; except, of course, when the film deals with the subject of music.

5. The use of title and introductory music is probably justifiable from an aesthetic standpoint.

6. When in doubt about the probable effect of music in an instructional film, good advice is to leave it out.

7. While the optimum length of a film depends on the subject and the audience, an instructional film should seldom exceed 20 to 25 minutes.

8. Whenever dealing with objects unfamiliar to the intended audience, some frame of reference is needed for size and time dimensions.

9. It is essential that content in instructional films be related to specific instructional objectives.

10. Dramatic sequences in instructional films should be used only when the subject clearly calls for it and then only when it can be done skillfully. Dramatic sequences are here defined as portions of a film in which the story or content is acted out by actors.

11. The use of negative examples through the showing of errors in instructional films can be effective in the following situations:

   a. If the subject matter deals with the affective domain.

   b. If the natural consequences of the error are shown along with a better alternative.

   c. If the correct method is or will be clearly established and practiced by the learner.

12. A good argument against the use of negative examples is that the visual impact is too great and some, who are daydreaming, might think the error is the approved way of doing things.

13. The strength of an instructional film should be primarily in the visual elements and secondarily in the narration and other audio elements.
14. It is important that an instructional film maker understand the language of sound motion pictures and be aware of the fact that this language may undergo changes from time to time. The "language of sound motion pictures" as used here refers to the conventions of the medium (i.e., various photographic and auditory effects and techniques, plus compositional and structural methods) and the way the conventions affect viewers.

15. When designing an instructional film, a major consideration must be to simplify and clarify the message as much as possible.

16. The instructional film maker must carefully assess his audience's level of ability.

17. The instructional film maker must research his subject well.

18. The instructional film narrator should not talk down or lecture to his audience.

19. The basic communication model of "WHO says . . . WHAT to . . . WHOM . . . for WHAT PURPOSE and with WHAT EFFECT" is a useful formula to follow in designing instructional films.

20. Instructional films should be field tested . . .

   a. . . . by trying out ideas in script or storyboard form and if possible in rough cut form . . .

   b. . . . by using sample audiences with opportunity for revision.

21. Statements about instructional film design which are based on research and on producer opinion should not be applied to film making in a narrow and simplistic fashion. As was pointed out in one of the reports of the Pennsylvania State University's Instructional Film Research Program, such statements can best be used to suggest critical areas in film design where decisions must be made rather than to tell what decisions to make.
SUMMARY

A panel of university and commercial producers of instructional films was selected by polling 17 key persons involved in university film production in the United States. These 17 individuals were asked to list the names of individuals in university and commercial film production whom they considered to be among the most experienced and knowledgeable in the area of designing instructional films. The resulting panel was composed of those individuals mentioned most frequently by the participants in the survey. It was composed of 11 university producers and 5 commercial producers for a total of 16.

These 16 individuals became the Delphi panel of this study. The Delphi Technique was selected as a means of getting a group of experts to arrive at a consensus without bringing them together face-to-face. After 3 successive rounds of Delphi questionnaires, the group reached a consensus on the generalizations from experimental research plus a list of producer-generated statements on film design. They also commented on the film research-to-practice alleged gap.

Fourteen of the original 16 panelists participated in all 3 rounds of questionnaires. The majority of panelists agreed with all except one of the statements in Part A (statement number 13a) and except four in Part B (statements 1b, 9, 11, and 13b). One additional statement, number 12b, was deleted because it was decided that it was not a design element.
The Part A statements of the final questionnaire (based on generalizations from experimental research which had the support of the Delphi panel of producers) were designated as primary operational generalizations and Part B statements (based on producer-generated statements upon which the majority of the producers agreed, plus one statement from Part A upon which the producers did not agree) were designated as secondary operational generalizations. These generalizations were stated in the preceding section of this chapter. Finally, the Delphi participants agreed in general that research findings bearing on the design of instructional films did not find their way into the majority of films.
CHAPTER V

ANALYSIS OF OUTSTANDING INSTRUCTIONAL FILMS

INTRODUCTION

Twenty instructional films were selected for analyzation of their use of specific design elements. The purpose of this analysis was to determine if some of the films identified as being outstanding which are being used for instructional purposes exhibited the characteristics of the list of primary and secondary operational generalizations. Substantial evidence of the utilization of any of the operational generalizations to design films would be considered as possible additional support of individual generalizations.

METHOD OF SELECTING OUTSTANDING INSTRUCTIONAL FILMS

It was decided to contact the audiovisual or media directors of the largest districts in the nation and to ask them to list from five to eight 16mm film titles that they considered to be among the best instructional films that were used in their district.

The kindergarten through grade twelve level was selected because it was felt that at this level, as opposed to the college level,
it would be easier to identify a sample of instructional films. It was felt that at the college level it would be more difficult to separate instructional films from research, experimental, and artistic films.

Audiovisual or media directors were selected to participate in this survey because it was thought that they, more than anyone else, would be familiar with the instructional quality of films held within their collections. They were asked to base their choices of films on feedback received from teachers, their own evaluative judgment, and any other source of information. They were also asked not to rely solely on frequency of booking as a criterion of selection.

The decision to survey the largest districts was based on the belief that these districts would be most likely to have a collection of instructional films and that the collections would be larger than those found in small or medium-sized districts. This decision was made after an unsuccessful attempt to locate a directory of public school district film libraries along with a listing of the number of titles that each district owned.

Using the *Education Directory, 1970-71: Public School Systems*, it was possible to find the names and addresses of all kindergarten through grade twelve or grade one through twelve districts with over 25,000 students. There were 186 districts of this type in the fall of 1970. In the directory only the names of superintendents were
given—no audiovisual directors' names. In an attempt to obtain the names of the audiovisual directors of the 186 districts, a search was made through the Association for Educational Communication and Technology's *AECT Membership Directory and Data Book, 1971-1972.* It was possible to clearly ascertain the names of the audiovisual directors of 39 of the 186 districts. An additional 5 were identified in the state of Washington by use of the telephone. The remaining 142 districts' superintendents were sent a questionnaire to identify the names of their audiovisual directors. A copy of this questionnaire is found in Appendix G.

Of the superintendents, 128 of 142, or 90 percent, responded to the questionnaire. Twenty-three respondents were eliminated from the study for the reasons which follow. Four respondents indicated that their district did not have an audiovisual director. Seven respondents did not indicate whether their audiovisual director supervised a collection of 16mm films. Eleven indicated that their audiovisual director did not supervise a 16mm film collection, and one


indicated that his district did not have 25,000 students. The remaining 105 respondents, coupled with the 39 who were identified from the AECT Membership Directory and Data Book, 1971-1972 and the 5 from the state of Washington, resulted in a sample of 149 audiovisual directors selected from the 186 largest school districts in the nation.

A questionnaire was developed to be sent to these 149 audiovisual directors. As indicated earlier, the purpose of this questionnaire was to compile a list of twenty outstanding films by asking each participant to list from five to eight 16mm film titles that they considered to be among the best instructional films that were used in their district. Instructional films were defined as films that involve a high degree of pre-planning and directional intent aimed at attaining selected and specific goals of instruction and that are designed for school audiences (kindergarten through grade 12) as opposed to theatrical, entertainment, sponsored, or experimental films. After a questionnaire was developed, it was sent for evaluation to four audiovisual directors who were not included in the sample, and then revised. The final questionnaire was in two slightly different versions: one to be sent to the 105 audiovisual directors identified through the preliminary questionnaire to school superintendents and the other to be sent to the 44 audiovisual directors selected by the membership directory and by telephone. Both versions are actually very similar and end up
giving the researcher the same essential information. These questionnaires can be found in Appendix H.

The Sample Films

The questionnaires were mailed in the spring of 1972. Of those that were sent questionnaires, 113 of 149, or 76 percent, responded. They nominated 507 different titles of which 102 were mentioned more than once. There were over 100 different film producers listed. The 20 titles mentioned most frequently are listed in Table 8.

As additional support of the status of the sample films as being outstanding for instructional purposes, eleven had received awards in educational or non-theatrical categories in major film competitions. These awards for each film are shown in Table 9. Other awards in educational categories include the first prize in the National Educational Film Festival for Is It Always Right to be Right? and "Best Educational and Best of Festival" by the National Visual Communications Association for Leo Beuerman. In addition, the Educational Film Library Association, the sponsor of the American Film Festival, selected Red Balloon as the "Best Film of the Decade" (1950's) and Paddle to the Sea as one of the ten best films of all time. Most of the films listed in Table 9 had won many other awards. For example, five of them won Academy Awards.
# TABLE 8

**TOP TWENTY FILMS SELECTED AS BEING AMONG THE BEST INSTRUCTIONAL FILMS IN USE IN THEIR DISTRICT IN POLL OF LARGE-DISTRICT AUDIOVISUAL DIRECTORS**  
(113 OF 149 RESPONDING)

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<th>Title of Film</th>
<th>Distributor</th>
<th>Year of Release</th>
<th>No. of Times Mentioned by Participants</th>
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<tr>
<td>1. Red Balloon</td>
<td>CCM Films</td>
<td>1957</td>
<td>17</td>
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<tr>
<td>2. Why Man Creates</td>
<td>Pyramid</td>
<td>1968</td>
<td>16</td>
</tr>
<tr>
<td>3. Rainshower</td>
<td>Churchill</td>
<td>1965</td>
<td>13</td>
</tr>
<tr>
<td>5. The Loon's Necklace</td>
<td>Encyclopaedia Britannica</td>
<td>1948</td>
<td>11</td>
</tr>
<tr>
<td>6. The Lottery</td>
<td>Encyclopaedia Britannica</td>
<td>1969</td>
<td>11</td>
</tr>
<tr>
<td>7. Donald in Mathmagic Land</td>
<td>Disney</td>
<td>1959</td>
<td>11</td>
</tr>
<tr>
<td>8. Beaver Valley</td>
<td>Disney</td>
<td>1953</td>
<td>10</td>
</tr>
<tr>
<td>10. Black and White Uptight</td>
<td>Bailey/Film Associates</td>
<td>1969</td>
<td>8</td>
</tr>
<tr>
<td>11. Hemo the Magnificent</td>
<td>American Telephone &amp; Telegraph Co.</td>
<td>1957</td>
<td>8</td>
</tr>
<tr>
<td>12. Leo Beuerman</td>
<td>Centron Corp.</td>
<td>1969</td>
<td>7</td>
</tr>
<tr>
<td>13. The Face of Lincoln</td>
<td>Univ. of So. Calif.</td>
<td>1955</td>
<td>6</td>
</tr>
<tr>
<td>15. Our Mr. Sun</td>
<td>American Telephone &amp; Telegraph Co.</td>
<td>1956</td>
<td>6</td>
</tr>
<tr>
<td>17. Pigs!</td>
<td>Churchill</td>
<td>1967</td>
<td>6</td>
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<tr>
<td>19. Drugs and the Nervous System (Revised)</td>
<td>Churchill</td>
<td>1971</td>
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TABLE 9
AWARDS RECEIVED BY FILMS IN SAMPLE

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<th>Title of Film</th>
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<th>CINE Golden Eagle</th>
<th>Landers Award of Merit</th>
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<tr>
<td>Why Man Creates</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rainshower</td>
<td>X</td>
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<td></td>
<td></td>
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<tr>
<td>An Occurrence at Owl Creek Bridge</td>
<td>X</td>
<td>X</td>
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</tr>
<tr>
<td>Leo Beuerman</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>The Face of Lincoln</td>
<td>X*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hailstones and Halibut Bones</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pigs!</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Paddle to the Sea</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drugs and the Nervous System</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Is It Always Right to be Right?</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*The Face of Lincoln won the top award of the American Film Assembly which was the forerunner of the American Film Festival.*
At this point it should be mentioned that upon analysis of the twenty sample films, it was found that the majority of the films would not qualify as being instructional in terms of the definition on the questionnaires. However, in view of the fact that it is probable that audiovisual directors would not always know if a film was produced with selected and specific goals of instruction in mind and whether or not it was produced for school audiences, it was assumed that the audiovisual directors looked upon these films as being instructional in nature. At least, they were apparently being used for instructional purposes. Since as mentioned in the definition of an instructional film in Chapter I, a broadly educational film or even a theatrical or entertainment film can become instructional through use, it was concluded that the sample of twenty films were, for the purposes of this study, instructional through their use in schools.

The films in the sample ranged in age from the very recent—1971—to the old—1946. The oldest, Nanook of the North, was actually released in 1922, but the sound version which is in this sample was completed in 1946.

One-fourth of the films had literary ties. Two of the films—Paddle to the Sea and Hailstones and Halibut Bones—were based on books, while two others—An Occurrence at Owl Creek Bridge and The Lottery—were developed from short stories. The film, Is It Always Right to be Right? has been adapted as a book.
Considering the total sample in regard to the type of learning they were intended to (or had the potential to) foster, the affective domain was predominant. Three films—Red Balloon, An Occurrence at Owl Creek Bridge, and Is It Always Right to be Right?—could be used primarily only for dealing with affective learning. Another thirteen films combined possibilities for affective and cognitive learning, but with affective messages being stronger than the cognitive in most of the films. In four films—Beaver Valley, Nature's Half Acre, Hemo the Magnificent, and Our Mr. Sun—the messages were almost totally cognitive. None of the films in the sample dealt with the psychomotor domain of learning.

Only one film in the present sample was found in the samples of previous related studies. This film, The Loon's Necklace, was one used by Wagner.

Additional information on each of the sample films can be found in Appendix I and in the film analysis section which is found later in this chapter.

METHODS OF ANALYZING FILMS

At the outset of this research, the investigator had intended to examine each film to determine the incidence of use of the primary and secondary operational generalizations. As an instrument for analysis was being developed, it became clear that some of the design elements
could be isolated and analyzed quite readily; others presented a more formidable task. For still others, it appeared to be an impossible task. As a result, an Instructional Film Analyzation Guide in two parts was developed. Copies of this guide can be found in Appendix J. Part 1 of this guide was designed for use by individual examiners—in this case to be used by the present investigator. This part of the guide contained those operational generalizations and the suggested method of analyzation that could be handled by an individual examiner in a fairly objective manner. Part 2 of the guide was designed to analyze those items which were more subjective in nature. Consequently, this part was designed for use by a panel of examiners.

The present investigator did all of the examining for Part 1 items, and also served on the panels used in Part 2 examinations. Each of the twenty films were screened by the present investigator at least six times. In addition, they were viewed in each case at least twice by running them through a hand viewer. Scripts containing the final narrations were obtained for all of the films containing narration except five. The narrations of these five films were transcribed. The printed narrations thus became another resource that was used for analysis purposes.

Of the 55 operational generalizations, 10 were judged not to be analyzable within the limits of the present investigation. Twenty-three of the remaining 45 generalizations were analyzed entirely by the
present investigator. On an additional 6 operational generalizations, the present investigator shared the analyzation tasks with the two panels, i.e., some parts of a generalization were panel-analyzed, other parts were analyzed by the present investigator. The remaining 16 operational generalizations were analyzed by the panels, of which the present investigator was a member in each case.

As indicated earlier, Part 2 of the Instructional Film Analyzation Guide was used for panel examination. Because of the number of films in the sample and the fact that a number of them were quite lengthy, it was decided to form two panels of three examiners each. This meant that each panel member (with the exception of present investigator) would need to examine only ten films rather than twenty.

The four guest panelists are listed below:

Dr. Ray Wiman, Professor of Educational Media, Central Washington State College

Dr. Charles W. Vlcek, Professor of Educational Media and Director of Television Services, Central Washington State College

Dr. Charles W. Wright, Director of Audio-Visual Services, Central Washington State College

Dr. Donald J. Murphy, Professor of Education, Central Washington State College

All four have had considerable experience and/or training in the design, production, and use of instructional materials. All except for Dr. Vlcek
have designed and produced instructional films. Vlcek has designed many television programs and other media.

After Part 2 of the Instructional Film Analyzation Guide was prepared, it was submitted to the other panel members for study and suggestions for revisions. Some minor modifications were then made. As a means of training the other panelists in the use of the guide, two training sessions were scheduled. At the first session, all four guest panelists were shown the film Nation of Spoilers. Using a Singer Graflex Projector, Model 1120, that enables one to rewind at high speed without unthreading, the ending, a portion of the middle, and the beginning of the film were reshown. The panel then completed the analysis section for each item on the guide. The present investigator had screened this film before the panel session and had completed the guide in advance. After collecting each guide, a discussion ensued of any problems encountered.

On 6 of the 23 items on which they were asked to respond, there was less than a clear-cut consensus of opinion (i.e., at least an 80%-20% distribution of yes or no answers). In the discussion session it became clear that some of the divided opinion was due to a misunderstanding of some of the questions posed. In others, it was agreed that an honest lack of agreement was unavoidable and to be expected.

After some modifications in the questions on the guide, a second training session was held. The session began with a general
discussion of the guide and then specific discussion of each item with a consensus margin of less than 80%-20%. The purpose of this discussion was to clear up any further misunderstandings that might exist. Then a second training film was shown. The title of this film was Monarch Butterfly Story. The same procedure was followed of reshowing the ending, a portion of the middle, and the beginning. The panel then completed the questions on the guide.

The tallying of the responses to the questions on the guides showed that on only 4 of 22 items was there less than a clear-cut consensus margin of at least 80%-20%. On 14 items the response was either a unanimous yes or a no. In discussing the guide with the panel members, they all then felt that they were quite comfortable with the instrument. It should be pointed out, however, that a few items on the guide were very difficult to analyze. This was often true of the questions which dealt with attention-gaining and attention-directing devices.

With the completion of the training of the panel, they were split into two panels of three each (including the present investigator serving as a member of each panel) and the analysis of the sample films began. Each screening session was limited to one or two films. In each case the present investigator completed his guide prior to the panel screenings. As in the training sessions, the film was shown once in its entirety, and then the ending, a portion of the middle, and the beginning were reshown. The guides were then completed and given to
the present investigator. The results of these film examinations will be reported along with the results of the Part 1 individual examinations in the next section of this chapter. Total scores for Part 2 of the guide are presented in Appendix K. A vote of 2 to 1 or greater was accepted as a majority.

THE ANALYSIS OF THE SAMPLE FILMS

The procedure that was followed was to consider each primary and secondary operational generalization in terms of evidence of existence of its use in the sample films. The data collected through using both Parts 1 and 2 of the Instructional Film Analyzation Guide will be combined and discussed for each operational generalization.

Primary Operational Generalizations

1. Since viewers perceive and respond selectively to motion pictures, instructional films should be prepared with a specific audience in mind, i.e., the film should accommodate the wants, feelings, interests, experiences, and perceptual tendencies of a well-defined viewer group.

Analysis: As near as it could be determined through examining the films, their study guides, and by contacting the producers, it was found that 8 of the 20 films were prepared with a well-defined school audience in mind. For example, The Lottery was designed for junior and senior high school humanities students and Drugs and the Nervous System was designed for health classes in junior high school. One less
specific, but still a fairly well-specified audience, was *Black and White Uptight*. This film was designed for use in junior and senior high school and college social studies classes.

Of interest, though, was the fact that the majority of films (12) were not designed specifically for school audiences but for the general public instead. For example, two of the films, *Our Mr. Sun* and *Hemo the Magnificent*, were designed for use on commercial television. The three Disney films, *Donald in Mathmagic Land*, *Nature's Half Acre*, and *Beaver Valley*, were designed as theatrical short subjects and *Leo Beuerman* was produced because the originator of the film thought the subject of the film was a story that needed to be told.

2. Audience participation and/or practice (either overt or covert) during a film presentation can improve learning if it is appropriate to the learning task and if it does not constitute an interference with the film's message.

**Analysis:** Through an analysis of the films and their printed narrations, it was found that 5 of the 20 films did use audience participation devices, all of a covert nature. In *Rainshower* the only narrative was at the beginning. It invites the viewer to "hear the quiet sounds" of the storm and the periods before and after it. The narrator also alerts the viewer that as "you look, you may be reminded of something you have seen, or heard, or felt . . . on a day such as this." Comments of this nature tend to draw the audience in, to increase their mental participation. In *Paddle to the Sea*, the first question invites
participation: "Where had he come from . . . how did he get here . . . this little creature called Paddle to the Sea?" In Black and White Uptight the audience is frequently asked questions dealing with prejudice. With most viewers this would lead to a mental response. Questioning techniques inviting participation were also used in Drugs and the Nervous System and in Leo Beuerman.

3. During a film presentation involving student participation, learning can be improved if a student is supplied with a knowledge of results about his performance.

Analysis: No examples of the supplying of knowledge of results to a learner were found in any of the films.

4. The subjective camera view should be used in training subjects to perform a perceptual motor task, i.e., show a performance or demonstration on the screen the way the learner would see it rather than from the view of a bystander.

Analysis: None of the films involved the training of perceptual motor tasks.

5. A pictorial stimulus and a verbal response or label appears to be the most effective arrangement of pictorial and verbal material.

Analysis: Two films, Red Balloon and Pigs, were completely void of any verbal response (narration) or labeling. Four other films, Rainshower, Why Man Creates, An Occurrence at Owl Creek Bridge, and The Lottery, were heavily pictorial with few verbal responses and labels used. In 12 of the films the pictorial stimulus and verbal
response or labeling arrangement was the predominant pattern. The remaining 2 films did not strictly follow that pattern. In Hailstones and Halibut Bones, particularly in Part 1, the words of the poem which served as narration were often used as the stimuli and the visuals would follow. In The Face of Lincoln sometimes the picture and commentary seemed at cross-purposes. For example, as the sculptor is working on the bust of Lincoln, he is talking about Lincoln's childhood and later life rather than about what he (the sculptor) is doing.

6. Pictures are often ambiguous without the use of words, i.e., the picture needs the word as often as the word needs the picture.

Analysis: Two films, Rainshower and Pigs, were designed to be somewhat ambiguous and open to various responses and interpretations. They are advertised as films for discovery. Consequently, Pigs has no narration or dialogue and Rainshower has only 44 seconds of narration at the beginning of the film. Three other films which had little or no narration or dialogue, Red Balloon, Why Man Creates, and An Occurrence at Owl Creek Bridge, whether by plan or accident, are ambiguous.

In the other 15 films in the sample, the pictures were generally accompanied by narration, dialogue, or labeling. While this was generally true, 3 films had a considerable number of reaction shots during dialogue sequences. These shots generally had no verbal
accompaniment. In each of the three Disney films, there were several segments of one minute or longer where music or sound effects were used with the visuals and no verbal accompaniment was used. For example, in Beaver Valley there was a segment referred to as a "Symphony of the Summer Night." During this segment the pictures of crickets and frogs were accompanied by music and natural sounds of the night. However, these segments were generally very low in information; they were, instead, primarily for entertainment purposes. In Paddle to the Sea there were many scenes which followed segments of narration that were wordless. But in these cases earlier words or following words helped the viewer to interpret the action. And finally, with The Face of Lincoln, the same comments mentioned in the preceding item (number 5) about the commentary and the visuals being at cross-purposes also apply here.

7. The visual and audio elements have a greater combined effect than either one alone, provided the two elements are relevant to each other.

Analysis: All twenty films combined the use of visual and audio throughout the films. In the films where there was little or no narration, there was other audio such as music and sound effects. All visuals and audio seemed to be relevant to each other with the exception of portions of The Face of Lincoln already discussed in items 5 and 6 above.
8. Vision is a sense that is best for spatial distinctions (e.g., mountain, mile, cube, and leaf shape) but relatively poor for temporal distinctions.

Analysis: By examining the twenty films, it was found that generally visuals were used for spatial distinctions, but often with the support of audio elements. However, there were a number of instances in which the visuals were used for temporal distinctions, but these were exceptions rather than being the general pattern. In *Pigs* there was no narration but it was obvious from the visuals that the film began at dawn (lighting angle from sun, animals sleeping). The angle of the lighting from the sun also suggested dawn at the beginning of *An Occurrence at Owl Creek Bridge*. In *Red Balloon* a cut to a drawn black window shade which was then raised suggested a transition from night to the next morning.

In even more cases, the visuals showed temporal changes, but with the support of the audio. In *Hailstones and Halibut Bones* visuals showed snowy scenes and fall leaves to suggest winter and fall, but the audio narrative accompanying these scenes gave them more precise meaning. In *An Occurrence at Owl Creek Bridge* visuals were used to convey the fact that the prisoner was having a dream, but sound effects supported this impression. In *Beaver Valley* temporal changes of season to season, night to day, and day to night were suggested visually, but not without audio support. In *Drugs and the Nervous System* visuals were used to show the effect on the body of taking drugs.
Temporal changes in heart beat and blood flow are shown visually, but narration also accompanied these visuals. And finally, in *Nature's Half Acre*, time lapse photography and accompanying audio were used extensively to compress time.

9. Audition (the sense of hearing) is best for temporal distinctions (e.g., rhythm, sequence, frequency, music, or speech) but relatively poor for spatial distinctions.

**Analysis:** An examination of the sample films generally supported this generalization. Audition was used extensively for temporal distinctions and no examples were found where audition was used independently of a visual for spatial distinctions. Even in some of the films with little or no narration the music helped to enhance a rhythm of movement. This was especially true in *Nature's Half Acre*.

10. If a concept involves both time and space (e.g., plant growth, life cycles, erosion, city, and the westward movement) use both vision and audition.

**Analysis:** All of the films dealt with concepts involving both time and space in varying degrees, and both vision and audition were used to develop these concepts.

11. Vision is a sense that is best when it is desirable to hold a message in the perceptual field of an audience for some time. With audition, repetition is required for critical examination.

**Analysis:** This operational generalization was judged to be not directly analyzable within the limits of the present investigation.
12. The visual mode is a less ambiguous mode of transmission than is the auditory.

Analysis: This operational generalization was judged to be not directly analyzable within the limits of the present investigation.

13. Attention-gaining devices which call attention to irrelevant materials may interfere with the learning of more important items.

Analysis: After viewing all twenty films, the majority of panel members agreed that none of the films contained attention-gaining devices of this nature.

14. Attention-directing devices (e.g., animation techniques, color, close-ups, slow or fast motion, unusual sounds, and the use of selected camera angles) may aid learning by calling attention to relevant points of a visual which may otherwise be overlooked.

Analysis: In 14 of 20 of the films the majority of the panel members agreed that the films contained attention-directing devices of this type.

15a. Color in instructional films has not been demonstrated to produce any general over-all increased learning in comparison with black and white films, except when the learning involved a color discrimination.

Analysis: Seventeen of the 20 films were in color. Of these 17 films, the use of color in 11 of the films was judged by the majority of panel members as important in learning the concepts of each film. In 7 of these 11 films, a color discrimination was given as the crucial
color factor affecting learning. This would indicate that in only 4 of the 10 films not involving a color discrimination was color judged to be important to the learning task.

15b. Color can in some cases prove to be a distracting influence.

*Analysis:* The majority of panel members agreed that in none of the 17 color films was color used as a distracting influence.

15c. There is some evidence that color should be used in media design, but the nature of its precise effect can, perhaps, not be assessed in terms of measurable outcomes of learning.

*Analysis:* As reported in 15a above, this investigation found that in 11 of 17 films color was judged to be an important factor affecting learning.

16a. Film commentaries should be simplified as much as possible.

*Analysis:* Only 16 of the 20 films contained sufficient commentary for analyzation. The majority of panel members agreed that all of these films had commentary that was simplified as much as possible. In addition, it was decided to use the Dale-Chall Readability Formula to measure the difficulty level of the commentary.³

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The Dale-Chall Formula was selected because Klare and Powers, Sumner, and Kearl\(^4\) had concluded that it is the most accurate readability formula available. A second reason for selecting the Dale-Chall formula was an earlier study somewhat similar to the present one had used it.\(^5\) It was felt this would facilitate making conclusions about film commentary levels. Klare and others have pointed out that readability formulas are only approximations and they should not be accepted dogmatically.\(^6\) Powers, Sumner, and Kearl, Holmquist,\(^7\) and others have expressed concern about the accuracy of the Dale-Chall Formula and all other older formulas. Their concern is that the language has undergone changes which the older formulas do not take into consideration. These considerations should all be weighed when reading formula scores and the resulting suggested grade placement of materials.


\(^5\)Wagner, "Design in the Educational Film."

\(^6\)Klare, The Measurement of Readability, p. 25.

After the Dale-Chall Formula was applied to the 16 films, it was found that all except one had a Dale-Chall corrected grade level that was equal to or lower than the producer's intended grade level. This one film, *Hailstones and Halibut Bones*, was designed for use in kindergarten through grade three, but the Dale-Chall Readability Formula placed it at a difficulty level of grades five and six. The results of the application of the Dale-Chall Formula are shown in Table 10.

16b. The commentary should avoid the use of unfamiliar names or technical terms.

**Analysis:** Only 16 of the 20 films contained sufficient commentary for analyzation. The majority of panel members agreed that in 14 of the 16 films there were no instances of use of unfamiliar or technical terms which might be unfamiliar to the intended audience. The films cited as containing unfamiliar or technical terms were *Our Mr. Sun* and *Donald in Mathmagic Land*. Using the Dale-Chall method of identifying unfamiliar words, the mean number of unfamiliar words per sample for all 16 films was 11. The mean number of unfamiliar words per sample for *Our Mr. Sun* was 14 and for *Donald in Mathmagic Land* it was 16. Only 2 other films exceeded a mean of 14 unfamiliar words per sample. These were *Nature's Half Acre* with 17 and *Drugs and the Nervous System* with 18. However, since unfamiliar words count is a part of the Dale-Chall formula and all 4 of these films had a
TABLE 10

RESULTS OF APPLYING DALE-CHALL READABILITY FORMULA TO 16 OF 20 OF THE SAMPLE FILMS

<table>
<thead>
<tr>
<th>Film Title</th>
<th>Dale-Chall Score*</th>
<th>Corrected Grade Level*</th>
<th>Producer's Intended Grade Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rainshower</td>
<td>4.9173</td>
<td>4 &amp; below</td>
<td>Kindergarten-3</td>
</tr>
<tr>
<td>The Loon's Necklace</td>
<td>5.4983</td>
<td>5-6</td>
<td>6-12</td>
</tr>
<tr>
<td>The Lottery</td>
<td>4.3912</td>
<td>4 &amp; below</td>
<td>7-12</td>
</tr>
<tr>
<td>Donald in Mathmagic Land</td>
<td>5.9302</td>
<td>5-6</td>
<td>General Audience</td>
</tr>
<tr>
<td>Beaver Valley</td>
<td>6.0121</td>
<td>7-8</td>
<td>General Audience</td>
</tr>
<tr>
<td>Nature's Half Acre</td>
<td>6.6990</td>
<td>7-8</td>
<td>General Audience</td>
</tr>
<tr>
<td>Black and White Uptight</td>
<td>5.9585</td>
<td>5-6</td>
<td>7-College</td>
</tr>
<tr>
<td>Hemo the Magnificent</td>
<td>6.2438</td>
<td>7-8</td>
<td>General Audience</td>
</tr>
<tr>
<td>Leo Beuerman</td>
<td>6.0573</td>
<td>7-8</td>
<td>General Audience</td>
</tr>
<tr>
<td>The Face of Lincoln</td>
<td>5.9404</td>
<td>5-6</td>
<td>General Audience</td>
</tr>
<tr>
<td>Nanook of the North</td>
<td>5.5159</td>
<td>5-6</td>
<td>General Audience</td>
</tr>
<tr>
<td>Our Mr. Sun</td>
<td>6.0324</td>
<td>7-8</td>
<td>General Audience</td>
</tr>
<tr>
<td>Hailstones and Halibut Bones</td>
<td>5.3955</td>
<td>5-6</td>
<td>Kindergarten-3</td>
</tr>
<tr>
<td>Paddle to the Sea</td>
<td>4.9366</td>
<td>4 &amp; below</td>
<td>General Audience</td>
</tr>
<tr>
<td>Drugs and the Nervous System</td>
<td>6.6300</td>
<td>7-8</td>
<td>7-12</td>
</tr>
<tr>
<td>Is It Always Right to be Right?</td>
<td>6.2467</td>
<td>7-8</td>
<td>7-College</td>
</tr>
</tbody>
</table>

*Average of all samples taken for each film.
Dale-Chall Formula corrected grade level rating which was compatible with each film's intended audience (see Table 10), it is probably reasonable to conclude that the unfamiliar words in each film did not create a serious problem with the intended audience.

17a. Film narrations should be designed so as to not have either too little or too much talk. In determining the right amount of talk, complexity of the material and the intellectual level of the audience must be taken into account.

**Analysis:** All seventeen of the films that contained narration were judged by the majority of panel members as not having either too little or too much talk.

17b. For relatively simple materials involving narration only, listening comprehension is likely to be most effective at speeds around 160 words a minute. When the narration is accompanied by video, the optimum rate appears to be lower.

**Analysis:** Sixteen of the 20 films contained enough narrative material to make adequate sampling. The results of the calculation of the word per minute rate for each film are reported in Table 11. The mean score of samples for all 16 films was 108 words per minute. The lowest mean score of samples taken within any film was *Paddle to the Sea* at 48 words per minute with the highest mean score of samples for any film being 140.4 words per minute for *Black and White Uptight*. However, of the 136 samples taken in the 16 films, 34 individual samples contained a word per minute rate of over 140 and 14 a word per minute rate of over 160. In 13 of 21 samples in the film *Our Mr. Sun*


<table>
<thead>
<tr>
<th>Film Title</th>
<th>Number of Samples Taken</th>
<th>Words Per Minute</th>
<th>No. of Samples Over 140 WPM</th>
<th>No. of Samples Over 160 WPM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rainshower</td>
<td>1</td>
<td>120.00</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>The Loon's Necklace</td>
<td>4</td>
<td>103.00</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>The Lottery</td>
<td>Entire film*</td>
<td>54.18</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Donald in Mathmagic Land</td>
<td>10</td>
<td>111.10</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Beaver Valley</td>
<td>11</td>
<td>100.80</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Nature's Half Acre</td>
<td>12</td>
<td>98.00</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Black and White Uptight</td>
<td>13</td>
<td>140.40</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Hemo the Magnificent</td>
<td>20</td>
<td>132.00</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Leo Beuerman</td>
<td>5</td>
<td>125.50</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>The Face of Lincoln</td>
<td>8</td>
<td>125.00</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Nanook of the North</td>
<td>12</td>
<td>103.40</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Our Mr. Sun</td>
<td>21</td>
<td>136.20</td>
<td>13</td>
<td>4</td>
</tr>
<tr>
<td>Hailstones and Halibut Bones</td>
<td>6</td>
<td>115.00</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Paddle to the Sea</td>
<td>Entire film*</td>
<td>48.00</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Drugs and the Nervous System</td>
<td>9</td>
<td>89.00</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Is It Always Right to be Right?</td>
<td>4</td>
<td>128.50</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>135</strong></td>
<td><strong>108.00</strong></td>
<td><strong>34</strong></td>
<td><strong>14</strong></td>
</tr>
</tbody>
</table>

*Word per minute rate for entire film was calculated because of the sparcity of commentary.*
the word per minute rate exceeded 140. In 4 samples it exceeded 160. In *Hemo the Magnificent*, 6 of 20 samples exceeded 140 words per minute with 2 of those samples exceeding 160 words per minute. In *Black and White Uptight* 5 of 13 samples exceeded 140 words per minute with 4 of those exceeding 160 words per minute.

18. In the narration of an instructional film, the active form of sentence structure is preferable to the passive form.

**Analysis:** Working with two grammar specialists, a method was devised to determine the relative incidence of passive forms of sentence structure in the narrations of 16 of the 20 films which contained sufficient narration for analyzation. This method is explained in the Instructional Film Analyzation Guide, Part 1, which is found in Appendix J. The results of the analyzation of the 16 films are found in Table 12. In all 16 films it was found that the use of the active form of sentence structure predominated. Two of the films were completely void of any passive constructions. Overall, it was estimated that only 8.1 percent of the sentences contained passive constructions. However, sampling techniques revealed that only an estimated 37 percent of the narration of all 16 films contained potentially passive sentences.

In all 16 films there were 181 sentences which contained passive constructions. This can be compared with an estimated 1,068 sentences which contained transitive verbs and were thus capable of
<table>
<thead>
<tr>
<th>Title of Film</th>
<th>Number of Words in Narration</th>
<th>Average Sentence Length (Words)</th>
<th>Estimated Number of Sentences in Narration (1*2)</th>
<th>Estimated Percent of Sentences Containing Transitive Verbs (Potentially Passive)</th>
<th>Estimated Number of Sentences Containing Transitive Verbs (Potentially Passive) (3x4)</th>
<th>Number of Sentences Containing Passive Constructions (Actually Passive)</th>
<th>Percent of Actually Passive Compared to Potentially Passive (6*5)</th>
<th>Percent of Actually Passive Compared to Total Number of Sentences (6*3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rainshower</td>
<td>89</td>
<td>15</td>
<td>6</td>
<td>36</td>
<td>2</td>
<td>1</td>
<td>.5</td>
<td>16.7</td>
</tr>
<tr>
<td>The Loon's Necklace</td>
<td>707</td>
<td>10</td>
<td>71</td>
<td>38</td>
<td>27</td>
<td>1</td>
<td>3</td>
<td>1.4</td>
</tr>
<tr>
<td>The Lottery</td>
<td>909</td>
<td>7</td>
<td>129</td>
<td>44</td>
<td>57</td>
<td>0</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Donald in Mathmagic Land</td>
<td>1,664</td>
<td>11</td>
<td>151</td>
<td>65</td>
<td>98</td>
<td>13</td>
<td>13</td>
<td>8.6</td>
</tr>
<tr>
<td>Beaver Valley</td>
<td>2,508</td>
<td>13</td>
<td>193</td>
<td>55</td>
<td>106</td>
<td>15</td>
<td>14</td>
<td>7.8</td>
</tr>
<tr>
<td>Nature's Half Acre</td>
<td>2,207</td>
<td>15</td>
<td>147</td>
<td>35</td>
<td>51</td>
<td>14</td>
<td>28</td>
<td>9.6</td>
</tr>
<tr>
<td>Black and White Uptight</td>
<td>4,809</td>
<td>18</td>
<td>267</td>
<td>38</td>
<td>101</td>
<td>20</td>
<td>20</td>
<td>7.5</td>
</tr>
<tr>
<td>Hero the Magnificent</td>
<td>6,951</td>
<td>13</td>
<td>534</td>
<td>28</td>
<td>150</td>
<td>20</td>
<td>13</td>
<td>3.7</td>
</tr>
<tr>
<td>Leo Beerman</td>
<td>1,216</td>
<td>18</td>
<td>68</td>
<td>36</td>
<td>24</td>
<td>8</td>
<td>33</td>
<td>13.0</td>
</tr>
<tr>
<td>The Face of Lincoln</td>
<td>2,606</td>
<td>16</td>
<td>163</td>
<td>29</td>
<td>48</td>
<td>26</td>
<td>54</td>
<td>15.9</td>
</tr>
<tr>
<td>Nanook of the North</td>
<td>3,079</td>
<td>15</td>
<td>205</td>
<td>27</td>
<td>55</td>
<td>15</td>
<td>27</td>
<td>7.3</td>
</tr>
<tr>
<td>Our Mr. Sun</td>
<td>7,624</td>
<td>13</td>
<td>586</td>
<td>43</td>
<td>252</td>
<td>33</td>
<td>13</td>
<td>5.6</td>
</tr>
<tr>
<td>Hairstones and Halibut Bones</td>
<td>1,069</td>
<td>14</td>
<td>76</td>
<td>21</td>
<td>16</td>
<td>0</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Paddle to the Sea</td>
<td>1,178</td>
<td>17</td>
<td>69</td>
<td>40</td>
<td>28</td>
<td>6</td>
<td>21</td>
<td>0.7</td>
</tr>
<tr>
<td>Drugs and the Nervous System</td>
<td>1,505</td>
<td>13</td>
<td>115</td>
<td>21</td>
<td>24</td>
<td>3</td>
<td>12</td>
<td>14.3</td>
</tr>
<tr>
<td>Is It Always Right to be Right?</td>
<td>922</td>
<td>14</td>
<td>66</td>
<td>44</td>
<td>29</td>
<td>7</td>
<td>24</td>
<td>10.6</td>
</tr>
<tr>
<td>Totals</td>
<td>39,042</td>
<td>2,846</td>
<td>1,068</td>
<td>181</td>
<td>20</td>
<td>20</td>
<td>8.1</td>
<td>8.1</td>
</tr>
<tr>
<td>Averages</td>
<td>2,440</td>
<td>14</td>
<td>178</td>
<td>37</td>
<td>20</td>
<td>20</td>
<td>8.1</td>
<td>8.1</td>
</tr>
</tbody>
</table>
being passive. Thus the sampling indicated that only 20 percent of the sentences estimated to be potentially passive were actually passive.

19. In instructional films, still pictures may sometimes replace the use of moving pictures, and be equally as effective and less expensive.

**Analysis:** For the purpose of this examination, still pictures were defined as static, non-motion representations that, had they been recorded with a motion picture camera in a normal manner, they would have shown movement. However, as the original scene was photographed with a still camera, motion was frozen. Using this as a definition of still pictures, the investigator found that only 2 of the 20 films contained any still pictures. These two films used still pictures of living scientists.

20. The visual image should be simplified as much as possible. Only the most relevant and necessary attributes should be included in the image. All irrelevant attributes should be excluded.

**Analysis:** In only 3 of the 20 films did the majority of panel members agree that the films contained any irrelevant visual material that should have been omitted.

21a. Because man is a selective perceiver and is limited in the amount of information he can process, the rate of development of a film should be slow enough to permit him to grasp the material as it is shown.
Analysis: Using as a definition of rate of development the screen time devoted to each phase of the action, in only 1 of the 20 films did the majority of panel members agree that the rate of development was too fast. That film was *Why Man Creates*.

21b. The rate of development should be ever slower at points at which it is necessary for the viewer to change attention from one source to another.

_Analysis:_ Source refers to the source of information, e.g., alternation of attention from one part of a visual to another, from one sequence to another, or from a predominantly visual message to a predominantly audio message. It was decided in this investigation to look at the beginning and end of each film and marked sequence changes as points of alternation of attention. This was accomplished for these parts of each film by (1) counting the words per minute and (2) measuring scene length of appropriate samples. This data is summarized in Table 13. Length of scenes in each sample were calculated by using a film synchronizer which contained a foot-frame counter. The figures for each film were recorded on the work sheet found in Section C of Part 1 of the Instructional Film Analyzation Guide.

In analyzing the data in this table, it was found that in 6 of 15 films the beginning had a slower rate of narration and in 15 of 20 films the beginning had a longer mean scene length than the means for all samples taken from each film. Ten of 15 endings had a slower rate
<table>
<thead>
<tr>
<th>Title of Film</th>
<th>Words Per Minute</th>
<th>Scene Length (In Sec.)</th>
<th>Mean of All Samples</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Beginning</td>
<td>End</td>
<td>Sequence Changes</td>
</tr>
<tr>
<td>Red Balloon *c</td>
<td>55.0</td>
<td>16.4</td>
<td>14.0</td>
</tr>
<tr>
<td>Why Man Creates *c</td>
<td>16.3</td>
<td>3.5</td>
<td>2.3</td>
</tr>
<tr>
<td>Rainshower *c</td>
<td>18.0</td>
<td>4.5</td>
<td>10.5</td>
</tr>
<tr>
<td>An Occurrence at Owl Creek Bridle</td>
<td>37.9</td>
<td>15.5</td>
<td>14.9</td>
</tr>
<tr>
<td>The Loon's Necklace</td>
<td>20.0</td>
<td>7.0</td>
<td>15.0</td>
</tr>
<tr>
<td>The Lottery</td>
<td>4.8</td>
<td>4.2</td>
<td>4.0</td>
</tr>
<tr>
<td>Donald in Mathmagic Land</td>
<td>5.0</td>
<td>16.0</td>
<td>11.1</td>
</tr>
<tr>
<td>Beaver Valley</td>
<td>11.9</td>
<td>7.3</td>
<td>6.6</td>
</tr>
<tr>
<td>Nature's Half Acre</td>
<td>8.0</td>
<td>7.3</td>
<td>7.6</td>
</tr>
<tr>
<td>Black and White Upright</td>
<td>5.3</td>
<td>4.3</td>
<td>9.1</td>
</tr>
<tr>
<td>Homo the Magnificent</td>
<td>32.2</td>
<td>5.1</td>
<td>6.5</td>
</tr>
<tr>
<td>Leo Beerman</td>
<td>13.9</td>
<td>17.7</td>
<td>12.4</td>
</tr>
<tr>
<td>The Face of Lincoln</td>
<td>16.1</td>
<td>60.0</td>
<td>39.3</td>
</tr>
<tr>
<td>Nanook of the North</td>
<td>11.3</td>
<td>8.2</td>
<td>8.0</td>
</tr>
<tr>
<td>Our Mr. Sun</td>
<td>6.5</td>
<td>3.4</td>
<td>6.8</td>
</tr>
<tr>
<td>Hellstone's and Halibut Bones</td>
<td>8.5</td>
<td>6.1</td>
<td>5.6</td>
</tr>
<tr>
<td>Pipsel *c</td>
<td>10.5</td>
<td>9.9</td>
<td>6.8</td>
</tr>
<tr>
<td>Paddle to the Sea</td>
<td>22.6</td>
<td>24.1</td>
<td>15.8</td>
</tr>
<tr>
<td>Drugs and the Nervous System</td>
<td>6.0</td>
<td>10.7</td>
<td>14.9</td>
</tr>
<tr>
<td>Is It Always Right to be Right?</td>
<td>8.3</td>
<td>8.3</td>
<td>8.3</td>
</tr>
</tbody>
</table>

*a* Scene as used here is synonymous with shot, meaning a continuous view filmed by one camera without interruption.

*b* Not all films contained discernible sequence changes.

*c* Contained no narration or not enough to adequately sample.
of narration and 12 of 20 endings had a longer mean scene length than the means for all samples taken from each film. In the 11 sequence changes where the narration rate was computed, 9 had a rate slower than the means of all samples taken for each film. However, in the 13 sequence changes where the scene length was computed, only 4 had a mean scene length greater than the mean of all samples taken for that film.

In conclusion, through applying the methods devised in this investigation to the sample films, it seemed reasonable to conclude that in general the rate of development did slow down at points where the viewer had to change his attention from one source of information to another.

22a. Introductory and summary material in a film may increase the amount of learning.

**Analysis:** Miller defined an introduction as "a statement about the content of a film. It may be an over-all description of what is to follow; it may simply relate the major objective of the film. Sometimes an introduction comes after the opening scene of the film." Miller also defined a summary:

A summary of the information is called a review. There are two kinds of review. **Spaced** review usually follows each unit of information as it is presented (not to be confused with

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Miller, "16mm Instructional Film Research," p. 115.
redundancy); massed review usually occurs at the end of the film. Either type can review the points through pictures, words, or both. It may be a simple statement, or it may be more complex, but it must relate to what has been taught within the body of the film."^9

Through an examination of the films' images and their scripts or transcripts, the investigator used the above definitions to determine if each film contained an introduction or summary. It was found that while 12 of the 20 films contained introductions, only 1 had a summary.

22b. The main function of introductions is to alert the audience as to what to expect and to thereby direct attention to relevant features. Summaries serve to restate and re-emphasize the main points.

Analysis: Of the 12 of 20 films that contained introductions, the majority of panel members for all 12 films agreed with the above definition of introductions. For the 1 film that contained a summary, the majority of the panel agreed with the above definition of summaries.

23. The effectiveness of a film can be improved by organizing it so that important sequences or concepts are repeated by depicting the same idea in several ways.

Analysis: The present investigator examined each film for visual repetition and each film's script or transcription for audio repetition. Only in 8 of the 20 films was any form of repetition found.

^9 Ibid., p. 116.
Secondary Operational Generalizations

1. While man's attention is known to be drawn to that which is novel and complex, attention-gaining devices as used in instructional films apparently add little to an otherwise well-made film. (Some examples are zooms, music, extreme magnification, and stop motion.)

   **Analysis:** In the opinion of the majority of each film panel, 18 of the 20 films contained attention-gaining devices.

2. Optical effects (fades, dissolves) contribute little to the informational content of an instructional film.

   **Analysis:** Three of the films contained fades and dissolves only in the title sections and not in the main body of the film. It is interesting to note that these 3 films were among the top 6 judged to be outstanding. Of the 17 films that contained fades or dissolves in the main body, the film panels agreed that in none of these films did these optical effects contribute to the informational content. However, in three of the films superimposed images were singled out as adding to the informational content. Table 14 gives the total numbers of fades and dissolves used in each film.

   2a. . . . but they can serve as a form of punctuation . . .

   **Analysis:** By punctuation, it is meant that optical effects have come to mean that there is a passage of time or a change of locale. In writing, punctuation reveals that one paragraph or chapter is completed and a new one will follow. With fades and dissolves a similar
<table>
<thead>
<tr>
<th>Title of Film</th>
<th>Titles Fades</th>
<th>Dissolves</th>
<th>Main Body Fades</th>
<th>Dissolves</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Balloon</td>
<td>2</td>
<td>16</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Why Man Creates</td>
<td>5</td>
<td>1</td>
<td>5</td>
<td>65</td>
</tr>
<tr>
<td>Rainshower</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>48</td>
</tr>
<tr>
<td>An Occurrence at Owl Creek Bridge</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>The Loon's Necklace</td>
<td>3</td>
<td>3</td>
<td>30</td>
<td>26</td>
</tr>
<tr>
<td>The Lottery</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Donald in Mathmagic Land</td>
<td>5</td>
<td>2</td>
<td>7</td>
<td>34</td>
</tr>
<tr>
<td>Beaver Valley</td>
<td>6</td>
<td>0</td>
<td>6</td>
<td>19</td>
</tr>
<tr>
<td>Nature's Half Acre</td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>45</td>
</tr>
<tr>
<td>Black and White Uptight</td>
<td>5</td>
<td>7</td>
<td>1</td>
<td>169</td>
</tr>
<tr>
<td>Hemo the Magnificent</td>
<td>16</td>
<td>14</td>
<td>4</td>
<td>45</td>
</tr>
<tr>
<td>Leo Beuerman</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>18</td>
</tr>
<tr>
<td>The Face of Lincoln</td>
<td>2</td>
<td>3</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Nanook of the North</td>
<td>4</td>
<td>0</td>
<td>44</td>
<td>1</td>
</tr>
<tr>
<td>Our Mr. Sun</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>22</td>
</tr>
<tr>
<td>Hailstones and Halibut Bones</td>
<td>8</td>
<td>1</td>
<td>47</td>
<td>100</td>
</tr>
<tr>
<td>Pigs!</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Paddle to the Sea</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>28</td>
</tr>
<tr>
<td>Drugs and the Nervous System</td>
<td>4</td>
<td>0</td>
<td>12</td>
<td>20</td>
</tr>
<tr>
<td>Is It Always Right to be Right?</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>81</strong></td>
<td><strong>53</strong></td>
<td><strong>165</strong></td>
<td><strong>644</strong></td>
</tr>
</tbody>
</table>

*a Only total scene fades and dissolves were counted. Did not count dissolves in and out of title words or captions or in animated frames unless all of frame was dissolved.

*b Fade ins and fade outs were counted separately because they were not always used together.
transitional effect appears to be possible. The investigator examined each film to find evidence of uses of these types of film punctuation.

In 13 of the 20 films what was considered to be a form of film punctuation was found. In 9 films, 1 or more sequences were separated by fades. In 2 other films dissolves were used for the same purpose. In 2 films dissolves were used to suggest a flashback, and in at least 1 film, dissolves were used to separate items that were being enumerated—much like a comma is used in writing.

2b. . . . and can make an aesthetic contribution to a film.

Analysis: The majority of panel members agreed that in 11 of the 17 films that used fades or dissolves in the main body of the film, these effects made an aesthetic contribution to the total production.

3. In instructional films dealing with content which involves the affective domain (learning dealing with feeling states associated with attitudes, values, and appreciations), the main contribution of music is to help establish the mood and pace.

Analysis: Two films did not use music in the main body of the film. Four other films involved no affective learning. For the remaining 14 films, the majority of panelists for each film agreed that music helped to establish the mood, and for 13 of 14 films the majority of panelists agreed that music helped to establish the pace.
4. Other than the contribution cited in the previous statement, music generally adds little to the informational content of an instructional film; except, of course, when the film deals with the subject of music.

**Analysis:** Two films did not use music in their main bodies. In 17 of the other 18 films, the majority of each panel agreed that the generalization applied.

5. The use of title and introductory music is probably justifiable from an aesthetic standpoint.

**Analysis:** Four films used no title or introductory music. One of those films, *The Lottery*, used no music in the entire production. In the other 16 films the panels agreed that the generalization applied to each film.

6. When in doubt about the probable effect of music in an instructional film, good advice is to leave it out.

**Analysis:** This operational generalization was judged to be not directly analyzable within the limits of the present investigation.

7. While the optimum length of a film depends on the subject and the audience, an instructional film should seldom exceed 20 to 25 minutes.

**Analysis:** Table 15 shows the length of each film. The films ranged in length from 8 minutes in *Is It Always Right to be Right?* to 56 minutes for *Our Mr. Sun*. The mean for all films was 26.6 minutes. Half of the films exceeded 25 minutes in length. Of those 10 films, the majority of panel members agreed in 8 cases with the
### TABLE 15
LENGTH OF 20 SAMPLE FILMS

<table>
<thead>
<tr>
<th>Title of Film</th>
<th>Length in Minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Balloon</td>
<td>33.5</td>
</tr>
<tr>
<td>Why Man Creates</td>
<td>25</td>
</tr>
<tr>
<td>Rainshower</td>
<td>14.5</td>
</tr>
<tr>
<td>An Occurrence at Owl Creek Bridge</td>
<td>27.5</td>
</tr>
<tr>
<td>The Loon's Necklace</td>
<td>11</td>
</tr>
<tr>
<td>The Lottery</td>
<td>18</td>
</tr>
<tr>
<td>Donald in Mathmagic Land</td>
<td>26</td>
</tr>
<tr>
<td>Beaver Valley</td>
<td>31.5</td>
</tr>
<tr>
<td>Nature's Half Acre</td>
<td>32.5</td>
</tr>
<tr>
<td>Black and White Uptight</td>
<td>35</td>
</tr>
<tr>
<td>Hemo the Magnificent</td>
<td>55</td>
</tr>
<tr>
<td>Leo Beuerman</td>
<td>13</td>
</tr>
<tr>
<td>The Face of Lincoln</td>
<td>22</td>
</tr>
<tr>
<td>Nanook of the North</td>
<td>54</td>
</tr>
<tr>
<td>Our Mr. Sun</td>
<td>56</td>
</tr>
<tr>
<td>Hailstones and Halibut Bones (Parts 1 and 2)</td>
<td>13</td>
</tr>
<tr>
<td>Pigs!</td>
<td>11</td>
</tr>
<tr>
<td>Paddle to the Sea</td>
<td>28</td>
</tr>
<tr>
<td>Drugs and the Nervous System</td>
<td>18</td>
</tr>
<tr>
<td>Is It Always Right to be Right?</td>
<td>8</td>
</tr>
<tr>
<td>Mean Length</td>
<td>26.6</td>
</tr>
</tbody>
</table>
generalization. The 2 films cited as not being possible to shorten to less than 25 minutes were Nanook of the North and Our Mr. Sun.

8. Whenever dealing with objects unfamiliar to the intended audience, some frame of reference is needed for size and time dimensions.

Analysis: Relating unfamiliar objects with familiar objects can be done both visually (e.g., showing an insect next to a ruler) and verbally (e.g., stating that the size of the insect is similar to your thumbnail.) The present investigator viewed each film to look for examples of where size and time dimensions were explained by use of some frame of reference.

In 13 of the 20 films, no frame of reference was used. However, in only one of these films did the investigator find a case where a frame of reference was needed and not used. In Nature's Half Acre time lapse photography was used in some cases and not identified as such and in many other cases it was difficult to judge the relative size of an object by what was included in the visual. The two Bell Telephone films, Our Mr. Sun and Hemo the Magnificent, used frames of reference most extensively.

9. It is essential that content in instructional films be related to specific instructional objectives.

Analysis: In the questionnaire (see Section 4 of Part 1 of the Instructional Film Analyzation Guide found in Appendix J) sent to
producers, the following question was asked: "Were selected and specific instructional objectives in existence to guide the production of this film?" Eighteen questionnaires were returned. Of these, 3 did not respond to the question. Of the 15 questionnaires with responses, 7 answered "yes" and 8 answered "no." Each respondent also listed the specific objectives. Study guides were available for the 5 films from which no response was received from their producers. In examining these films, it was found that for 2 of 5 films, objectives were listed. Combining the totals from the questionnaire and the examination of guides resulted in the situation that 9 films had instructional objectives and 11 did not. Three of the 9 films with objectives were not originally designed for school audiences. The objectives were formulated after a school use possibility was confirmed. Of the 11 films that did not list objectives, 4 were made specifically for school audiences. The other 7 films were made for non-school audiences.

None of the objectives were stated in behavioral terms. Most were stated in very general terms. For example, for The Lottery the objective was to stimulate interest in the short story as a literary form and provide a focus for classroom discussion. For Drugs and the Nervous System, the objective was to influence attitudes on the use of drugs. The objectives for The Loon's Necklace, the second oldest film in the sample, were probably most specific:
The film was planned to (1) retell a charming Indian legend, using masks to establish the characters of the story, (2) display a selection of authentic Indian ceremonial masks in natural color, (3) show how masks can portray specific personalities, concepts, and emotions, and (4) illustrate the influence of the forces of nature upon Indian art and folklore.

10. Dramatic sequences in instructional films should only be used when the subject clearly calls for it and then only when it can be done skillfully. Dramatic sequences are here defined as portions of a film in which the story or content is acted out by actors.

**Analysis:** It was decided by the investigator that 9 of the 20 films contained dramatic sequences. Of these 9, for 7 of the films the majority of panel members agreed that the subject clearly called for the use of dramatic sequences and that in all 9 films the dramatic sequences were done skillfully.

11. The use of negative examples through the showing of errors in instructional films can be effective in the following situations:

11a. If the subject matter deals with the affective domain.

**Analysis:** Of the 16 films which had content which dealt with the affective domain, 3 films contained instances where a negative example was used. One was in *Is It Always Right to be Right?* This film showed an example of what happens to men who think they are always right. In *Donald in Mathmagic Land*, Donald was shown figuring a billiard shot using improper procedures. In the film, *Drugs and the Nervous System*, the fallacious thinking was presented that if 2 aspirin
make you feel better when sick, then why not take 20 to get completely well.

11b. If the natural consequences of the error are shown along with a better alternative.

Analysis: The same 3 films mentioned in 11a above followed the negative examples by showing the natural consequences of the error along with a better alternative.

11c. If the correct method is or will be clearly established and practiced by the learner.

Analysis: All 3 of the films mentioned in 11a above showed the correct method along with the negative examples. Whether they will be practiced by the learner is beyond the control of the film designer.

12. A good argument against the use of negative examples is that the visual impact is too great and some, who are daydreaming, might think the error is the approved way of doing things.

Analysis: This operational generalization was judged to be not directly analyzable within the limits of the present investigation.

13. The strength of an instructional film should be primarily in the visual elements and secondarily in the narration and other audio elements.

Analysis: The majority of panel members agreed with the generalization in 15 of the 20 films. The 5 films that were judged to
have placed the visual subordinate to the narration and other audio elements were *Hailstones and Halibut Bones*, *Black and White Uptight*, *The Face of Lincoln*, *Drugs and the Nervous System*, and *Why Man Creates*.

14. It is important that an instructional film maker understand the language of sound motion pictures and be aware of the fact that this language may undergo changes from time to time. The "language of sound motion pictures" as used here refers to the conventions of the medium (i.e., various photographic and auditory effects and techniques, plus compositional and structural methods) and the way the conventions affect viewers.

**Analysis:** This generalization was judged to be not directly analyzable within the limits of the present investigation.

15. When designing an instructional film, a major consideration must be to simplify the message as much as possible.

**Analysis:** The majority of panel members judged 18 of the 20 films to have their messages simplified and clarified as much as possible. The 2 films which received negative votes were *Why Man Creates* and *Our Mr. Sun*.

16. The instructional film maker must carefully assess his audience's level of ability.

**Analysis:** This generalization was judged to be not directly analyzable within the limits of the present investigation.

17. The instructional film maker must research his subject well.
Analysis: This generalization was judged to be not directly analyzable within the limits of the present investigation.

18. The instructional film narrator should not talk down or lecture to his audience.

Analysis: Talking down was defined as addressing an audience as if you are voluntarily coming down to the level of inferiors. Only 16 of the 20 films contained sufficient narration for analyzation. The majority of panelists for all 16 films agreed that the film narrators did not talk down to their audiences and in 15 of 16 films agreed that the narrator was not lecturing to the audiences. The 1 film judged to contain narrative which was lecturing in nature was Black and White Uptight.

19. The basic communications model of "WHO says . . . WHAT to . . . WHOM . . . for WHAT PURPOSE and with WHAT EFFECT" is a useful formula to follow in designing instructional films.

Analysis: The generalization was judged to be not directly analyzable within the limits of the present investigation.

20. Instructional films should be field tested . . .

a. . . . by trying out ideas in script or story-board form and if possible in rough cut form . . .

Analysis: The questionnaire in Section 4 of Part 1 of the Instructional Film Analyzation Guide was used. This questionnaire is in Appendix J. The producers of 18 of the 20 films responded to this
generalization on the questionnaire. All 18 indicated that field testing of the type mentioned was not used in the production of the film in question.

20b. ... by using sample audiences with opportunity for revision.

Analysis: The same questionnaire cited in 20a above was used. The producers of 18 of the 20 films responded to this generalization on the questionnaire. All 18 indicated that field testing of the type mentioned was not used in the production of the film in question.

21. Statements about instructional film design which are based on research and on producer opinion should not be applied to film making in a narrow and simplistic fashion. As was pointed out in one of the reports of the Pennsylvania State University's Instructional Film Research Program, such statements can best be used to suggest critical areas in film design where decisions must be made rather than to tell what decisions to make.

Analysis: This generalization was judged to be not directly analyzable within the limits of the present investigation.

RESULTS OF THE ANALYSIS

In determining whether or not there was evidence of the existence of use of an operational generalization in the total sample of films, a criterion of simple majority was used. Table 16 summarizes the results of the analyzation of the primary and secondary operational generalizations.
For the primary operational generalizations, of the 29 generalizations, 2 were found to be not directly analyzable and 1 did not apply to the sample films. Of the remaining 26 primary operational generalizations, evidence of use in the majority of applicable films was found in 20-1/2, or 79 percent of the cases.

For the secondary operational generalizations, of the 26 generalizations, 7 were found to be not directly analyzable. Of the remaining 19 secondary operational generalizations, evidence of use in the majority of applicable films was found in 11, or 58 percent of the cases.

An analysis of the voting patterns of the panels revealed the following data. The two panels collectively responded to 409 questions in analyzing the 20 films. On 303, or 74 percent, of the questions, there was a unanimous 3-0 yes or no vote. On an additional 8, or 2 percent, of the questions, there was a vote of 2-0. On the remaining 98 questions, or 24 percent of the total, there was a 2-1 split in the vote. In 62 of these 98 cases, or 15 percent of the 409 questions, the present investigator was a part of the majority. In 36 of 98 cases, or 9 percent of the 409 questions, the present investigator was in the minority.
# TABLE 16

<table>
<thead>
<tr>
<th>Type of Operational Generalization</th>
<th>Item Numbers of Primary Operational Generalizations</th>
<th>Total of Item Numbers</th>
<th>Item Numbers of Secondary Operational Generalizations</th>
<th>Total of Item Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Majority of Films Incorporating Essence of the Operational Generalization</td>
<td>5, 6, 7, 8, 9, 10, 13, 14, 15a, 15b, 15c, 16a, 16b, 17a, 17b, 18, 20, 21a, 21b, 22a(1/2)*, 22b</td>
<td>20-1/2</td>
<td>2, 2a, 2b, 3, 4, 5, 8, 10, 13, 15, 18</td>
<td>11</td>
</tr>
<tr>
<td>Majority of Films Not Incorporating Essence of the Operational Generalization</td>
<td>1, 2, 3, 19, 22a(1/2)*, 23</td>
<td>5-1/2</td>
<td>1, 7, 9, 11a, 11b, 11c, 20a, 20b</td>
<td>8</td>
</tr>
<tr>
<td>Operational Generalization Not Analyzable</td>
<td>11, 12</td>
<td>2</td>
<td>6, 12, 14, 16, 17, 19, 21</td>
<td>7</td>
</tr>
<tr>
<td>Operational Generalization Not Applicable to Any of Sample Films</td>
<td>4</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Totals** 29 26

*In 22a, the one-half votes were used because this generalization dealt with two elements--introductions and summaries.*
SUMMARY

This chapter outlined the process of selecting and analyzing twenty outstanding instructional films. A sample of 149 audiovisual directors selected from the 186 largest school districts in the nation were asked to list from five to eight 16mm film titles that they considered to be among the best instructional films used in their district. Responses were received from 113 audiovisual directors. The twenty films mentioned most frequently were: *Red Balloon*, *Why Man Creates*, *Rainshower*, *An Occurrence at Owl Creek Bridge*, *The Loon's Necklace*, *The Lottery*, *Donald in Mathmagic Land*, *Beaver Valley*, *Nature's Half Acre*, *Black and White Uptight*, *Hemo the Magnificent*, *Leo Beuerman*, *The Face of Lincoln*, *Nanook of the North*, *Our Mr. Sun*, *Hailstones and Halibut Bones*, *Pigs!*, *Paddle to the Sea*, *Drugs and the Nervous System*, and *Is It Always Right to be Right?*

An Instructional Film Analyzation Guide in two parts was developed to determine the incidence of use of the primary and secondary operational generalizations in the films. Part 1 of the guide was used by the present investigator to analyze those operational generalizations that could be handled in a fairly objective manner. Part 2 was designed to analyze those items which were more subjective in nature. Two panels of examiners were formed to analyze the films in terms of the guidelines given on the guide. After two training sessions, each
panel of three members (with the present investigator being one of the members in each case) analyzed ten films. In spite of the use of the panels, analyzation of the sample films was predominantly an activity of the present investigator.

The results of the analyzation of the twenty films was that, more often than not, evidence was found of the incorporation of the operational generalizations on film design into the sample films. For 79 percent of the primary operational generalizations and 58 percent of the secondary operational generalizations, evidence was found of incorporation of the essence of the generalizations into a majority of the applicable films.

The two panels collectively responded to 409 questions in analyzing the 20 films. On 74 percent of the questions there was a unanimous 3-0 yes or no vote. On 2 percent of the questions there was a 2-0 vote and on the remaining 24 percent, the vote split 2-1. The present investigator was in the majority except in 9 percent of the cases.
CHAPTER VI

INTEGRATION OF DATA ON THE PRIMARY AND SECONDARY OPERATIONAL GENERALIZATIONS

INTRODUCTION

The previous four chapters have presented literature and data on design elements of instructional films. This chapter will integrate this information as it applies to the list of primary and secondary operational generalizations. This information will include the findings of previous related studies, the results and comments of the Delphi survey, and the results of the analysis of the twenty outstanding instructional films.

It is important to remember that the primary operational generalizations are based on generalized findings from experimental research on instructional films and other media. The majority of the panel in the final Delphi questionnaire agreed with each statement that is listed.

The secondary operational generalizations resulted from a synthesis of statements made by the Delphi panel (experienced instructional film producers) on other areas of film design. The
generalizations as listed here were agreed to by the majority of panel members. One statement (number 1 under "Secondary Operational Generalizations") came from the list of primary operational generalizations. It was the one statement with which they did not agree.

In reporting findings from previous related studies, the following studies will be cited. These studies were discussed in more detail in Chapter II. The Harber study analyzed five instructional films. Wagner synthesized the results of the analysis of twenty-one educational films with empirical and experimental evidence. Miller identified nine instructional film design elements through a review of 16mm instructional film research. These nine elements were ones on which she felt there was enough research completed that one could have a considerable amount of confidence in them. Miller pointed out that the four primary design elements were supported quite solidly by research but the five secondary elements had less support. A sample of fifty films were examined to determine the inclusion or exclusion of the design elements.

McVey reviewed research in areas not usually associated with the visual specialist. He looked at research in environmental design,

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1 Harber, "Production Techniques."
2 Wagner, "Design in the Educational Film."
3 Miller, "16mm Instructional Film Research."
human factors engineering, architecture, experimental psychology, visual perception, ophthalmology, art, aesthetics and design, and motion picture and television engineering.  

Two efforts were made to look to theory as a basis for the design of demonstration films. May selected the Miller and Dollard theory of learning by imitation to formulate a list of rules or guiding principles to follow in designing demonstration films. Sheffield and Maccoby used both theory and research findings to devise a list of principles to be used in constructing films for teaching complex technical skills.

The studies by McConkey and by Vandermeer, Morrison, and Smith used a very different approach to the subject of designing instructional films. McConkey's approach was to develop a method of planning, producing, and evaluating films which provided for the application of research findings and techniques into the production. Vandermeer, Morrison, and Smith took two existing teaching films,

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4 McVey, "Visual Design and Presentation."
5 May, "Verbal Responses to Demonstrational Films."
6 Sheffield and Maccoby, "Constructing Filmed Demonstrations."
7 McConkey, "Non-Theatrical Film Production"; Vandermeer, Morrison, and Smith, "Improvement of Educational Motion Pictures."
revised them based on tests that were developed over their content, and then compared the revised and original versions of the films through the use of test data gathered from comparable groups of subjects. They concluded their study by listing the types of revisions made which collectively improved the films.

PRIMARY OPERATIONAL GENERALIZATIONS

1. Since viewers perceive and respond selectively to motion pictures, instructional films should be prepared with a specific audience in mind, i.e., the film should accommodate the wants, feelings, interests, experiences, and perceptual tendencies of a well-defined viewer group.

Integration of Data. The Delphi group was unanimous in their agreement with this statement. Harber found that in the films he analyzed, the camera techniques and the vocabulary and pictorial levels were geared closely to the learning levels of their intended audiences. One of Wagner's conclusions is applicable here. In discussing the well-designed educational film, he stated that its "... effect will be proportional to the degree to which it is based on the common interests and needs of the audience for which it is based." One of May's guiding principles for the design of demonstration films is that the designer should know his audience and the

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skills they already have. However, in the present study the majority of sample films were not planned for highly specific audiences.

2. Audience participation and/or practice (either overt or covert) during a film presentation can improve learning if it is appropriate to the learning task and if it does not constitute an interference with the film's message.

Integration of Data. The Delphi group was unanimous in their agreement with this statement. Miller listed participation as one of the four primary design criteria where extensive research has been conducted and where there is a general unanimity that the primary design criteria do improve learning when incorporated into a film. May has pointed out the importance of pausing between each sentence in a demonstration film to allow the learner to formulate his own verbal cues. However, in the present study the majority of the sample films did not use participation techniques.

3. During a film presentation involving student participation, learning can be improved if a student is supplied with a knowledge of results about his performance.

Integration of Data. The Delphi group was unanimous in their agreement with this statement. Miller listed reinforcement (through

\[\text{May, "Verbal Responses to Demonstrational Films," p. 176.}\]
\[\text{Miller, "16mm Instructional Film Research."}\]
\[\text{May, "Verbal Responses to Demonstrational Films," p. 178.}\]
knowledge of results) as one of her primary design elements.\(^{13}\)

However, in the present study the majority of sample films did not use feedback through the supplying with a knowledge of results about a learner's performance.

4. The subjective camera view should be used in training subjects to perform a perceptual motor task, i.e., show a performance or demonstration on the screen the way the learner would see it rather than from the view of a bystander.

Integration of Data. The Delphi group was unanimous in their agreement with this statement. Both May and Sheffield and Maccoby\(^{14}\) recommended use of the subjective angle in demonstration films. Since none of the sample films analyzed in the present study dealt with the training of perceptual motor tasks, this generalization was not analyzable.

5. A pictorial stimulus and a verbal response or label appears to be the most effective arrangement of pictorial and verbal material.

Integration of Data. The Delphi group agreed (10-3) with this statement. One of those disagreeing felt that sound should be used to convey that which the image cannot. Another felt that the generalization

\(^{13}\) Miller, "16mm Instructional Film Research," pp. 39-45.

\(^{14}\) May, "Verbal Responses to Demonstrational Films," p. 177; Sheffield and Maccoby, "Constructing Filmed Demonstration," p. 129.
would only be true when the picture and word reinforced each other directly. The present investigator found the majority of films in the present study's sample used the general arrangement described in the generalization.

6. Pictures are often ambiguous without the use of words, i.e., the picture needs the word as often as the word needs the picture.

**Integration of Data.** The majority of the Delphi group agreed (9-4) with this statement. Some of the dissenters felt that a well-designed visual should not be as ambiguous as a word without a picture. The majority of films in this study's sample used words generously with pictures with the exception of those films which were apparently intended to be ambiguous through the use of little or no narration.

May suggested that all parts and tools used in a demonstration film should be named, labeled, or numbered. \(^{15}\) Sheffield and Maccoby also have concluded that each part of an object such as a machine shown in a film should be given a name which as nearly as possible describes either some characteristic of the part or some characteristic of its location in an assembly. They also pointed out that as each part is selected for assembly, it should be displayed by itself while it is being named and described. Parts that are similar

\(^{15}\) May, "Verbal Responses to Demonstrational Films," p. 177.
in appearance but that go in different locations in an assembly should be placed together visually and their differences should be described verbally.¹⁶

7. The visual and audio elements have a greater combined effect than either one alone, provided the two elements are relevant to each other.

Integration of Data. The Delphi group was unanimous in their agreement with this statement. The present investigator found that the majority of films in the present study's sample combined the use of visual and audio elements.

8. Vision is a sense that is best for spatial distinctions (e.g., mountain, mile, cube, and leaf shape), but relatively poor for temporal distinctions.

Integration of Data. The majority of the Delphi group agreed (10-3) with this statement. One of the dissenters pointed out that temporal distinctions like 6:00 p.m. and summer can be expressed visually. In the analysis of the twenty films in the present study, other examples similar to these were also found, but in the majority of cases, the use of vision for spatial distinctions was the predominant pattern.

9. Audition (the sense of hearing) is best for temporal distinctions (e.g., rhythm, sequence, frequency, music, or speech), but relatively poor for spatial distinctions.

Integration of Data. The Delphi panel was unanimous in their agreement with this statement. In the majority of films in the present study, the use of audition for temporal distinctions was judged to be the predominant pattern.

10. If a concept involves both time and space (e.g., plant growth, life cycles, erosion, city, and the westward movement), use both vision and audition.

Integration of Data. The majority of the Delphi panel agreed with this statement. One idea expressed by dissenters was that a well-designed visual could in some cases handle both time and space. The analysis of the sample films in the present study showed that all films used both vision and audition to develop concepts involving time and space.

11. Vision is a sense that is best when it is desirable to hold a message in the perceptual field of an audience for some time. With audition, repetition is required for critical examination.

Integration of Data. The majority of the Delphi panel agreed (12-1) with this statement. This generalization was judged to be not directly analyzable using the sample of films in the present study.

12. The visual mode is a less ambiguous mode of transmission than is the auditory.
Integration of Data. The majority of the Delphi panel agreed (9-3) with this statement. Several of the dissenters emphasized the degree of ambiguity of the visual or the auditory depends on the film maker and, hence, felt they could not agree with this generalization. This generalization was judged to be not directly analyzable using the sample of films in the present study.

13. Attention-gaining devices which call attention to irrelevant materials may interfere with the learning of more important items.

Integration of Data. The Delphi panel was unanimous in their agreement with this statement. Through an analysis of the sample films in the present study, the analyzation panels found that none of the films contained devices described in the operational generalization.

14. Attention-directing devices (e.g., animation techniques, color, close-ups, slow or fast motion, unusual sounds, and the use of selected camera angles) may aid learning by calling attention to relevant parts of a visual which may otherwise be overlooked.

Integration of Data. The Delphi panel was unanimous in their agreement with this statement. The analysis of the sample films in the present study showed that in the majority of films, attention-directing devices of the type described were used.
Miller listed the use of attention-directing devices as one of her primary design elements. Vandermeer, Morrison, and Smith indicated that the insertion of attention-directing devices was one of the revisions used to improve new versions of two instructional films. The devices added were arrows and labels to identify objects.

\[15a\] Color in instructional films has not been demonstrated to produce any general over-all increased learning in comparison with black-and-white films, except when the learning involved a color discrimination.

Integration of Data. The majority of the Delphi panel agreed (11-2) with this statement. One of the dissenters felt that color can affect mood. Another felt that at the lower grades, color helps children in recognizing messages because it is truer to life than black and white. In the analyzation of the sample films in the present study, the majority of the films that were in color seemed to support this operational generalization.

Miller supported the use of color as a discriminating cue by listing it as one of her secondary design elements. McVey also

\[17\] Miller, "16mm Instructional Film Research," pp. 51-56.

\[18\] Vandermeer, Morrison, and Smith, "Improvement of Educational Motion Pictures," pp. 10-17.

\[19\] Miller, "16mm Instructional Film Research," pp. 70-73.
pointed out the value of color for discriminating by reporting that color is one of the two most effective means of coding information.\(^{20}\)

15b. Color can in some cases prove to be a distracting influence.

Integration of Data. The majority of the Delphi panel agreed (11-2) with this statement. The film analyzation panels in the present study did not find any films in which color was a distracting influence.

15c. There is some evidence that color should be used in media design, but the nature of the precise effect can, perhaps, not be assessed in terms of measurable outcomes of learning.

Integration of Data. The majority of the Delphi panel agreed (11-1) with this statement. In the analyzation of the sample films in the present study, the way color was used in the majority of films seemed to indicate that color was essential in those cases. Generally, color was used for discrimination purposes.

16a. Film commentaries should be simplified as much as possible.

Integration of Data. The majority of the Delphi panel agreed (11-2) with this statement. Several of the dissenters felt that simplification was acceptable, but if this led to over-simplification, there is a new problem. The film analyzation panels agreed that all of the

films with sufficient commentary to analyze were simplified as much as possible. A check with the Dale-Chall Readability Formula revealed that all of these same films except one had a commentary whose level of difficulty matched its intended audience.

Wagner concluded that the "... vocabulary level of audiences should be kept clearly in mind in preparing film narration, but it must be recognized that what is said is seldom as important as what is shown on the screen." Miller selected readability of film commentary as one of her secondary design elements. In the fifty films which she analyzed, she found a highly significant difference (.01), indicating that producers attempt to gear film commentary to the intended audience. In the study by Vandermeer, Morrison, and Smith, revisions of two films were improved by (1) changing the structure of the commentary (move action words to the beginning of sentences), (2) by using fewer words in the commentary, but retaining the essence of meaning, and (3) by using direct statements in the commentary versus student inference.

16b. The commentary should avoid the use of unfamiliar names or technical terms.

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22 Miller, "16mm Instructional Film Research," pp. 73-77.
23 Vandermeer, Morrison, and Smith, "Improvement of Educational Motion Pictures," pp. 10-17.
Integration of Data. The majority of the Delphi panel agreed (9-4) with this statement. Most of the dissenters felt that unfamiliar terms could be used as long as they are defined in the film. Also, films could be used for vocabulary building. The film analyzation panels in the present study agreed that in the majority of films the commentary did not include unfamiliar names or technical terms. The use of the Dale-Chall Readability Formula, which uses unfamiliar words as one of its indicators of difficulty, generally confirmed the analyzation panels' findings. May concluded that a film's commentary should use only words that the learner will be able to understand.24

17a. Film narrations should be designed so as to not have either too little or too much talk. In determining the right amount of talk, complexity of the material and the intellectual level of the audience must be taken into account.

Integration of Data. The Delphi panel was unanimous in their agreement with this statement. The film analyzation panels in the present study agreed that in all of the films containing narration, the way in which narration was used supported this generalization.

17b. For relatively simple materials involving narration only, listening comprehension is likely to be most effective at speeds around 160 words a minute. When the narration is accompanied by video, the optimum rate appears to be lower.

Integration of Data. The majority of the Delphi panel agreed (11-1) with this statement. One who agreed stated that most narrators generally speak at about 140 words per minute (long pauses excepted). A dissenter said 160 words per minute is close to the rate of most narrated films. The check of the sample films in this study showed that all films which contained enough narration to sample had an average of all samples of 140 or fewer words per minute. Wagner concluded from his study that the rate of narration should be between 100 and 130 words per minute.25

18. In the narration of an instructional film, the active form of sentence structure is preferable to the passive form.

Integration of Data. The Delphi panel was unanimous in their agreement with this statement. An analysis of the sample films in the present study revealed an estimate that for the 16 of 20 films containing sufficient narration for analyzation, only 8.1 percent of the total sentences contained passive constructions. However, only an estimated 37 percent of the narration of all 16 films contained potentially passive sentences.

19. In instructional films, still pictures may sometimes replace the use of moving pictures, and be equally effective and less expensive.

Integration of Data. The majority of the Delphi panel agreed (11-2) with this statement; however, evidence of its incorporation was not found in the majority of the sample of outstanding films analyzed in the present study. Harber concluded that a major power of the educational film lies in its ability to present concepts involving motion. This may explain the scarcity of use of still pictures in the sample films.  

20. The visual image should be simplified as much as possible. Only the most relevant and necessary attributes should be included in the image. All irrelevant attributes should be excluded.

Integration of Data. The majority of the Delphi panel agreed (12-1) with this statement. In the analyzation of the sample films in the present study, the panels agreed that the majority of films were simplified as much as possible.

21a. Because man is a selective perceiver and is limited in the amount of information he can process, the rate of development of a film should be slow enough to permit him to grasp the material as it is shown.

Integration of Data. The majority of the Delphi panel agreed (12-1) with this statement. In the majority of cases, analyzation panels used in the present study felt that the essence of this generalization was incorporated into the films. May concluded that the tempo

26 Harber, "Production Techniques," pp. 62-64.
of the picture should be as slow as possible, but yet be able to hold
the learner's attention. 27

21b. The rate of development should be even slower at
points at which it is necessary for the viewer to change
attention from one source to another.

Integration of Data. The majority of the Delphi panel agreed
(11-1) with this statement. The one dissenter made the following state­
ment: "A nicely timed pause--yes, or a turn of a phrase to re-direct
attention to a new element--but no slow down in rate of development
beyond a brief pause." The majority of the films analyzed in the
present study incorporated the essence of this operational generaliza­
tion. May supported the general notion of this operational generaliza­
tion in saying that each step in a demonstration film should be
separated from the next one by a pause, a fade-out, a statement by
the narrator, or some other device. 28

22a. Introductory and summary material in a film may
increase the amount of learning.

Integration of Data. The majority of the Delphi panel agreed
(12-1) with this statement. The one dissenter made the following state­
ment: "We are turned off very often by the didacticism of summaries.

27 May, "Verbal Responses to Demonstrational Films," p. 177.
28 Ibid.
If it's done well the first time, it should have a lasting impression."

In analyzing the twenty outstanding films in the present study, the majority of films had introductions but only one had a summary. Miller included both introductions and summaries as secondary design elements in her study. 29 May stated that if a step covered in a demonstration film is rather long or complex, some summarizing device should conclude it. 30 Vandermeer, Morrison, and Smith found that one of the things that made the revisions of their two films more effective was the strengthening of the introductions and improving the summaries. 31

22b. The main function of introductions is to alert the audiences as to what to expect and to thereby direct attention to relevant features. Summaries serve to restate and re-emphasize the main points.

Integration of Data. The Delphi panel was unanimous in their agreement with this statement. In the analysis of the sample films, the panels agreed with the above statements for all films that contained introductions or summaries. Wagner in his study reached the following conclusions for the well-designed educational film: "The film may well

29 Miller, "16mm Instructional Film Research," pp. 66-69.

30 May, "Verbal Responses to Demonstrational Films," p. 177.

31 Vandermeer, Morrison, and Smith, "Improvement of Educational Motion Pictures," pp. 10-17.
include an introduction which clearly and succinctly poses the problem, orients the audience, and establishes 'set,' or a condition of readiness for the presentation."  

23. The effectiveness of a film can be improved by organizing it so that important sequences or concepts are repeated by depicting the same idea in several ways.

Integration of Data. The majority of the Delphi panel agreed (11-1) with this statement. One of those agreeing stated that he agreed for the cognitive domain, but not for the affective. Another mentioned that such redundancy should be handled with care or you will lose the interest of the audience.

Wagner made the following conclusion dealing with repetition:

"Key ideas may be repeated two to four times for emphasis and reinforcement, but the repetitions should be varied and aesthetically satisfying as well."  

Redundancy was one of Miller's primary design elements. May concluded that the more difficult steps in a demonstration should be repeated two or three times, but with variations. However, the majority of the sample films analyzed in the present study did not use repetition.


33 Ibid., p. 241.

34 Miller, "16mm Instructional Film Research," pp. 46-51.

35 May, "Verbal Responses to Demonstrational Films," p. 178.
SECONDARY OPERATIONAL GENERALIZATIONS

1. While man's attention is known to be drawn to that which is novel and complex, attention-gaining devices as used in instructional films apparently add little to an otherwise well-made film. (Some examples are zooms, music, extreme magnification, and stop motion.)

Integration of Data. The majority of the Delphi panel disagreed (10–2) with this statement. Several of those commenting on this generalization had divided opinions about the use of the examples mentioned as attention-gaining devices. For example, two participants mentioned that zooms and music as attention-gaining devices can be dispensed with, but felt that extreme magnification and stop motion may be essential. May concluded that motivation devices may be built into a film or the teacher will have to be relied upon to provide them. The majority of films in the sample in the present study did include attention-gaining devices.

2. Optical effects (fades, dissolves) contribute little to the informational content of an instructional film, . . .

Integration of Data. The majority of the Delphi panel agreed (11–3) with this statement. One dissenter mentioned that superimposed images may convey information in a way that is unique. The analyzation panels in the present study did not find any cases of where fades or

\[36\text{Ibid., p. 176.}\]
dissolves contributed to the information of a film. However, in three films, superimposed images were singled out as adding to the informational context.

2a' . . . but they can serve as a form of punctuation . . .

Integration of Data. The majority of the Delphi panel agreed (12-2) with this statement. One dissenter mentioned that their use as punctuation is outmoded and no longer necessary, while another stated that most audiences do not perceive them. The present investigator found examples of their use as punctuation in the majority of the sample films.

2b. . . . and can make an aesthetic contribution to the film.

Integration of Data. The majority of the Delphi panel agreed (13-1) with this statement. The analyzation panels in the present study agreed that the majority of films used some fades and dissolves in an aesthetically pleasing manner.

3. In instructional films dealing with content which involves the affective domain (learning dealing with feeling states associated with attitudes, values, and appreciations), the main contribution of music is to help establish the mood and pace.

Integration of Data. The majority of the Delphi panel agreed (13-1) with this statement. The one dissenter felt that original scores for instructional films added another dimension. The analyzation panels
in the present study agreed that in the majority of the applicable sample films, music did help to establish the mood and pace.

4. Other than the contribution cited in the previous statement, music generally adds little to the informational content of an instructional film; except, of course, when the film deals with the subject of music.

Integration of Data. The majority of the Delphi panel agreed (11-3) with this statement. One participant stated that he generally agreed except when music becomes a part of the coverage of a social situation or a cultural milieu. In these cases the words of a song may add information to the film. Harber, in citing the example of the film *Eighteenth Century Life in Williamsburg, Virginia*, supported this position. He stated that music should have some relation to the content of a film, rather than being used just as an emotional stimulus. The analyzation panels in the present study agreed that the majority of the sample films did not use music for informational purposes.

5. The use of title and introductory music is probably justifiable from an aesthetic standpoint.

Integration of Data. The majority of the Delphi panel agreed (9-4) with this statement. Three of the dissenters felt that the primary purpose of title and introductory music was to set the sound level of the projector. Another felt that in some cases, sound effects would be

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37 Harber, "Production Techniques," pp. 67-68.
better. In the present study, for the films that used title and introductory music (16 of 20), the analyzation panels agreed that the music made an aesthetic contribution.

6. When in doubt about the probable effect of music in an instructional film, good advice is to leave it out.

Integration of Data. The majority of the Delphi panel agreed (12-2) with this statement. This operational generalization was judged to be not analyzable within the limits of the present study.

7. While the optimum length of a film depends on the subject and the audience, an instructional film should seldom exceed 20 to 25 minutes.

Integration of Data. The Delphi panel agreed unanimously with this statement. One who agreed made the following statement: "Although certain kinds of subjects require much more time for development and certain techniques (e.g., cinema verite) are slower in revealing things."

Wagner concluded that the length of instructional films would vary from five to thirty minutes. He added that length should not be the major consideration, but rather the nature of what is said and the manner of saying it in film form. Miller in her sample for films produced for the elementary grades found that the shortest film ran 10 minutes

38 Wagner concluded that the length of instructional films would vary from five to thirty minutes. He added that length should not be the major consideration, but rather the nature of what is said and the manner of saying it in film form. Miller in her sample for films produced for the elementary grades found that the shortest film ran 10 minutes.

and longest 20 minutes in length. The mode length was 11 minutes (39 of 50). 39

The sample films in the present study did not support this statement as a design generalization. Half of the films exceeded 25 minutes in length.

8. Whenever dealing with objects unfamiliar to the intended audience, some frame of reference is needed for size and time dimensions.

Integration of Data. The Delphi panel was unanimous in agreement with this statement. In the analyzation of the sample films in the present study, it was found that whenever a frame of reference was needed, it was used except in one film. Sheffield and Maccoby used the following principles in designing a training film: (1) To help establish a baseline for relative sizes of parts, at each stage of the assembly the structure assembled up to that point should be kept in view as much as possible. (2) A long shot should precede and follow a close-up of any part. This establishes the relative size of the unit compared with the rest of the assembly. 40 Vandermeer, Morrison, and

39 Miller, "16mm Instructional Film Research," p. 104.

Smith used as one of their revisions of two teaching films the relating of the sizes of objects in films to common objects. 41

9. It is essential that the content in instructional films be related to specific instructional objectives.

Integration of Data. The Delphi panel was unanimous in their agreement on this statement; however, the majority of films in the present study did not incorporate the essence of this generalization.

10. Dramatic sequences in instructional films should only be used when the subject clearly calls for it and then only when it can be done skillfully. Dramatic sequences are here defined as portions of a film in which the story or content is acted out by actors.

Integration of Data. The Delphi panel was unanimous in their agreement on this statement. The analysis panels agreed that of the films using dramatical sequences, in the majority of them the dramatic sequences were used when the subject clearly called for it and that the sequences were done skillfully.

11. The use of negative examples through the showing of errors in instructional films can be effective in the following situations:

a. If the subject deals with the affective domain.

Integration of Data. The majority of the Delphi panel agreed (9–5) with this statement. Some of the dissenters could see no reason

41 Vandermeer, Morrison, and Smith, "Improvement of Educational Films," pp. 10-17.
for the reference to the affective domain rather than cognitive or both. This generalization was not supported by its essence being present in the majority of the sample films used in the present study.

11b. If the natural consequences of the error are shown along with a better alternative.

Integration of Data. The majority of the Delphi panel agreed (12-2) with this statement. The two dissenters felt that negative examples should not be shown. May indicated that showing the dire consequences that may result from making the wrong responses at critical times may improve a film. The essence of this operational generalization was not found to have been incorporated into the majority of the sample films used in the present study.

11c. If the correct method is or will be clearly established and practiced by the learner.

Integration of Data. The Delphi panel was unanimous in their agreement with this statement. The essence of the operational generalization was not found to have been incorporated into the majority of the sample films used in the present study.

12. A good argument against the use of negative examples is that the visual impact is too great and some, who are daydreaming, might think the error is the approved way of doing things.

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42 May, "Verbal Responses to Demonstrational Films," p. 178.
Integration of Data. The majority of the Delphi panel agreed (11-3) with this statement. This generalization was judged to be not directly analyzable by the film panels in the present study.

13. The strength of an instructional film should be primarily in the visual elements and secondarily in the narration and other audio elements.

Integration of Data. The majority of the Delphi panel agreed (13-1) with this statement. One of the dissenters indicated that there is no consistent superiority of one over the other. Among those who agreed, one stated that sometimes the generalization would not be true in dialogue and dramatic sequences, and another said the strength of visual versus audio might vary at different points in a film. The analyzation panels in the present study agreed that the majority of the sample films showed the incorporation of the essence of this generalization.

14. It is important that an instructional film maker understand the language of sound motion pictures and be aware of the fact that this language may undergo changes from time to time. The "language of sound motion pictures" as used here refers to the conventions of the medium (i.e., various photographic and auditory effects and techniques, plus compositional and structural methods), and the way the conventions affect viewers.

Integration of Data. The Delphi panel was in unanimous agreement with their statement. This operational generalization was
judged not to be analyzable with the sample films in the present study.

15. When designing an instructional film, a major consideration must be to simplify the message as much as possible.

Integration of Data. The majority of the Delphi panel agreed (12-2) with this statement. One dissenter was concerned about the danger of oversimplification. Another felt that some instruction should be indirect and require the learner to put the message together. The analyzation panels in the present study judged the majority of the films to have simplified their messages as much as possible. Wagner concluded that the "structure of the film should be simple enough to be understood by its intended audience. It should not contain too many different ideas, nor move too fast." 43

16. The instructional film maker must carefully assess his audience's level of ability.

Integration of Data. The Delphi panel was in unanimous agreement with this statement. This generalization was not one that could be analyzed by the panels in the present study. Wagner 44 pointed out the need to keep the vocabulary level of the audience in

44 Ibid.
mind in preparing the narration and May emphasized that the designer should know his audience and the skills they already possess.

17. The instructional film maker must research his subject well.

Integration of Data. The Delphi panel was in unanimous agreement with this statement. This generalization was not one that could be analyzed by the panels in the present study. May pointed out that the performance to be filmed should be carefully analyzed and simplified before the picture is planned.

18. The instructional film maker should not talk down or lecture to his audience.

Integration of Data. The Delphi panel was in unanimous agreement with this statement. The analyzation panels used in the present study agreed that the majority of films did not use a style of narration that talked down or lectured to the audiences.

19. The basic communication model of "WHO says . . . WHAT to . . . WHOM . . . for WHAT PURPOSE and with WHAT EFFECT" is a useful formula to follow in designing instructional films.

45 May, "Verbal Responses to Demonstrational Films," p. 176.
46 Ibid.
Integration of Data. The majority of the Delphi panel agreed (13-1) with this statement. This generalization was not one that could be analyzed by the panels in the present study.

20. Instructional films should be field tested . . .

a. . . . by trying out ideas in script or story board form and if possible in rough cut form . . .

Integration of Data. The majority of the Delphi panel agreed (12-2) with this statement. Among those who commented on this generalization, there appeared to be a preference for field testing the rough cut as opposed to the script or story board. Both the methods of McConkey and of Vandermeer, Morrison, and Smith used approaches to the design of instructional films which involved field testing of materials. Among the sample films analyzed in the present study, none of their producers used either of these types of field testing.

20b. . . . by using sample audiences with opportunity for revision.

Integration of Data. The majority of the Delphi panel agreed (13-1) with this statement. One dissenter stated that this process was too expensive to be used. The McConkey and the Vandermeer, 

\[47\] McConkey, "Non-Theatrical Film Production"; Vandermeer, Morrison, and Smith, "Improvement of Educational Motion Pictures."
Morrison, and Smith\textsuperscript{48} methods also apply here. Among the sample films analyzed in the present study, none of their producers used this type of field testing.

21. Statements about instructional film design which are based on research and on producer opinion should not be applied to film making in a narrow and simplistic fashion. As was pointed out in one of the reports of the Pennsylvania State University's Instructional Film Research Program, such statements can best be used to suggest critical areas in film design where decisions must be made rather than to tell what decisions to make.

\textit{Integration of Data}. The Delphi panel was in unanimous agreement with this statement. This generalization was judged to be not one that could be analyzed by the panels in the present study.

\textbf{SUMMARY}

The results of the integration of information and data on the primary and secondary operational generalizations are summarized in Tables 17 and 18. In Table 17, for the primary operational generalizations, it can be seen that the Delphi panel of film producers supported all of the operational generalizations. The essence of 20.5 of 26 of the operational generalizations analyzable were judged as being used in the majority of the sample of films used in the present study.

\textsuperscript{48} McConkey, "Non-Theatrical Film Production"; Vandermeer, Morrison, and Smith, "Improvement of Educational Motion Pictures."
### TABLE 17
INTEGRATION OF DATA ON PRIMARY OPERATIONAL GENERALIZATIONS

<table>
<thead>
<tr>
<th>Number of Operational Generalization</th>
<th>Delphi Panel Support</th>
<th>Essence of Operational Generalization Used in Present Study Sample Films</th>
<th>Additional Support in Previous Related Studies</th>
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<td>1</td>
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<td>No</td>
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<td>Miller</td>
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<td>4</td>
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<td></td>
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<td>Vandermeer, Morrison, &amp; Smith, Miller</td>
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<td>Miller, McVey</td>
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<td>Yes</td>
<td></td>
</tr>
<tr>
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<td>Yes</td>
<td>Vandermeer, Morrison, &amp; Smith, Wagner, Miller</td>
</tr>
<tr>
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<td>Yes</td>
<td>Yes</td>
<td>May</td>
</tr>
<tr>
<td>17a</td>
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<td>Yes</td>
<td></td>
</tr>
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<td>Yes</td>
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<td>Summary~No</td>
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TABLE 18
INTEGRATION OF DATA ON SECONDARY OPERATIONAL GENERALIZATIONS

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<th>Number of Operational Generalization</th>
<th>Delphi Panel Support</th>
<th>Essence of Operational Generalization Used in Present Study Sample Films</th>
<th>Additional Support in Previous Related Studies</th>
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<td>Miller</td>
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<td>No</td>
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<td>Vandermeer, Morrison, &amp; Smith, McConkey</td>
</tr>
<tr>
<td>21</td>
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<td>Not Analyzable</td>
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</table>
Fifteen of the 29 statements were supported by one or more of the previously related studies. In the one previous study most similar to the present one, the Miller study, 7 of 9 of Miller’s instructional film design elements were found to be included in the present study.

Table 18 shows that of the secondary operational generalizations, all but one of the 26 statements were supported by the Delphi panel. The essence of 11 of 19 of the operational generalizations analyzable were judged as being used in the majority of sample films. However, only 9 of 26 of the operational generalizations were supported in previous related studies.
CHAPTER VII

SUMMARY AND CONCLUSIONS

SUMMARY

The making of instructional films by teachers, students, and other school personnel has become quite wide-spread. Information on the steps to follow in producing an instructional film is readily available, but the same cannot be said about information on the process to use in designing the material.

It seemed important to make available to these school personnel information on designing instructional films by analyzing the findings from research and by collecting the opinions of experienced film producers. It would be hoped that this information would not be used in a routine, formalized way, but rather as the basis for a more intelligent approach to the design and production of instructional films.

It was proposed to combine the products of research and the opinions of university and commercial producers of instructional films into operational generalizations on the design of instructional films. In addition, twenty instructional films judged to be outstanding would
be analyzed to determine the degree of inclusion of the essence of these operational generalizations into their design.

A review of the sources of information generally available to novice designers of instructional films and other materials revealed a paucity of specific guidelines in concise, easy-to-read-and-apply form. A number of earlier studies had been made to identify or analyze elements of design in instructional films. The present study differed from these studies in three ways: (1) none of the earlier studies attempted to survey the collective opinion of film producers as a source of data on film design. (2) All but one of the earlier studies examined individual research studies for bearing on film design while the present study dealt with research reviews. (3) Except for a study by McVey, none of the earlier studies attempted to cover such wide and diverse fields of research as was true of the present study.

After an extensive search of research reviews that would yield generalizations on design elements of instructional films, eight were finally selected. These were the reviews of research by Hoban and van Ormer, Carpenter and Greenhill, Travers, Fleming, Cook, Hartman, Chu and Schramm, and McVey. From these eight reviews, generalizations on elements of design of instructional films were combined, analyzed, and synthesized into a series of tentative operational generalizations.
These tentative operational generalizations, together with some general headings of other areas where research was inconclusive, were submitted to a panel of experienced and knowledgeable instructional film producers for reaction and evaluation. This panel was composed of eleven university producers and five commercial producers. Using the Delphi Technique, which involved three successive rounds of questionnaires, the group reached a consensus on the generalizations from experimental research and on a list of producer-generated statements on film design. They also commented on the film research-to-practice alleged gap.

The result of the Delphi survey was a stating of primary and secondary operational generalizations on instructional film design. They ranged from pre-design elements (e.g., understanding perception, stating objectives, understanding audience, and researching subject) to design elements (e.g., use of participation and reinforcement techniques, color, special effects, and repetition) to post-design elements (e.g., field testing). The complete listing of operational generalizations can be found on pages 115 through 120. In addition, the Delphi participants agreed in general that research findings bearing on the design of instructional films did not find their way into the majority of films.

Twenty outstanding instructional films were selected for analyzation of their use of the essence of each of the primary and
secondary operational generalizations. These films were selected by polling a sample of 149 audiovisual directors selected from the 186 largest school districts in the nation. The films were analyzed by the present investigator and, on a minority of the generalizations, by a panel.

The results of the analyzation of the twenty films was that, more often than not, evidence was found of the incorporation of the operational generalizations on film design into the sample films. For 79 percent of the primary operational generalizations and 58 percent of the secondary operational generalizations, evidence was found of incorporation of the essence of the generalizations into a majority of the films which applied in each instance.

Finally, an attempt was made to integrate information and data relating to the primary and secondary operational generalizations. This information and data included the findings of previous related studies, the results and comments of the Delphi survey, and of the analysis of the twenty outstanding films. This integrative effort yielded more support for the majority of the generalizations and offered numerous insights into each design element.
CONCLUSIONS

As a result of this study the following conclusions were reached:

1. There was a considerable body of experimental research on the design of instructional films and other media upon which there was substantial agreement in terms of the generalizations made. The group of film producers used in this study as a Delphi panel supported 29 of 30 of the generalizations synthesized from experimental research reviews. These became the primary operational generalizations in this study. They ranged from audience involvement elements (e.g., participation, reinforcement, and the use of the subjective camera angle) to picture and sound elements (e.g., pictorial and verbal presentation, use of color and motion, and the use of attention-directing and attention-gaining devices) to structural elements (e.g., the use of introductions and summaries).

2. Contrary to most of the literature on the use of research findings in designing instructional films and contrary to the majority opinion of the Delphi panel in this study, the majority of the twenty sample films in the present study showed evidence of the incorporation of the essence of a majority of the thirty generalizations synthesized from experimental research reviews.
3. The Delphi approach can be used to reach a consensus on elements of the design of instructional films. Almost equally as valuable in gaining insights into the process of designing instructional films was the dialogue that this process generated.

4. Nearly twenty years ago Wagner pointed out that studies analyzing the design of most-used instructional films needed to be continued on a constant basis. He indicated that we needed to know what kinds of films are popular, and, more importantly, why they are popular.¹ The present investigator would strongly agree with these thoughts. Detailed analyses of "popular" films as conducted in Wagner's study and similar analyses of "outstanding" films in the present study do yield considerable information about elements of film design that was not possible to obtain using other research strategies.

5. The primary and secondary operational generalizations which resulted from this study are not "principles" or "guidelines" to be used in systematically designing instructional films. They were derived to assist the novice film maker (and the experienced when applicable) in making wiser instructional decisions when designing instructional films. While the primary operational generalizations rest on generalized findings from experimental research and the approval of them by a group of experienced and knowledgeable film producers and

¹Wagner, "Design in the Educational Film," p. 238.
the secondary operational generalizations rest primarily on the opinion of this same group of producers, they are not "final truths" and each generalization most certainly will not apply to the design of every instructional film. To apply any of these operational generalizations to the design of an instructional film, the integrated information and data for each operational generalization as presented in Chapter VI should be read and pondered.

6. A film becomes instructional either by design or by use. While some entertainment, theatrical, or broadly educational films can become instructional through use, they are exceptions to the general rule that instructional films should be carefully planned in terms of the audience involved, the objectives, the wide range of design elements and their probable effect, and the content.

DISCUSSION

It was encouraging that the present study revealed that there was a considerable body of experimental research upon which a group of experienced and knowledgeable film producers could agree, and that further evidence indicated that many of the products of this research have found their way into the design of a sample of films judged to be outstanding.

The fact that a majority of the operational generalizations based on research findings were incorporated into a majority of the
sample films may be due to any one or a combination of the following reasons:

1. It was purely accidental or intuitive or a result of established practice.

2. Much of the better known and substantiated research dealing with design elements may be becoming a part of the conventional wisdom of instructional film makers.

3. The method of analysis of the sample films may not be precise enough to isolate, identify, and classify the various design elements.

In regard to the last-mentioned possibility, every effort was made to make the film analysis process as precise as possible. It was felt that this objective was largely achieved, but it must be admitted that the type of film analysis used in this study is very difficult and time-consuming. Some elements of design were extremely difficult to identify and analyze. This was especially true of primary operational generalizations numbers 8, 9, and 10 (dealing with spatial and temporal distinctions through the use of the auditory and visual senses). Future researchers will undoubtedly be able to refine and perhaps simplify the analysis process.

Rather than a product of imprecise research methods, it was felt that the fact that many of the operational generalizations based on research were incorporated into the sample films was due to a
combination of items 1 and 2. Several of the Delphi panelists did feel that producers are becoming more aware of research findings. Furthermore, some of the design elements that research has supported as being instructionally sound were used in films long before many of the research studies were conducted.

SUGGESTIONS FOR FURTHER RESEARCH

The following are areas where it might be productive to engage in future research. These are areas which were outside the limits of the present study, but were related to it and to the central theme of the design of instructional films.

1. The secondary operational generalizations produced in this study generally involved areas of film design where research was insufficient or inconclusive. Experimental research should be continued on the film design elements involved in each generalization.

2. Further film analysis research is needed to determine the effective design elements used in films judged to be outstanding. Studies of individual design elements need to be undertaken as well as studies using a comprehensive approach similar to the one used in the present investigation. Such individual design element studies could further help to improve and refine the methods used to analyze instructional films.
3. The majority of the twenty sample films analyzed in the present investigation were not designed for use in instructional settings. While it was pointed out that films of this type can become instructional through use, nevertheless, it must be re-emphasized that twenty films designed for instruction were not analyzed in the present investigation. This may have been a factor in the finding that the majority of films did incorporate the majority of the operational generalizations. Additional study is needed to either confirm or refute this speculation.

4. In the present study, twenty films judged to be outstanding were analyzed to determine if there was evidence of the use of the operational generalizations on design. The question may be asked: Is it possible that most commercially distributed films incorporate the majority of the operational generalizations on design that were derived in this study and that excellence comes from some other factor? Future studies might explore this matter by analyzing other samples of outstanding instructional films as well as those that are judged to be average or even poor.

5. Controlled studies are needed to determine the effectiveness of the Delphi Technique as used in studies similar to the present one.

6. The present study was apparently a pioneering effort to systematically collect, analyze, and synthesize the opinions of a group
of experienced and knowledgeable film producers on the design of instructional films. This is an area that needs much additional research effort.

7. Obviously, it was not possible to observe the process of designing the films in the sample. It was possible in some cases to query the producers about the process used in each film. For example, they were asked if the films were designed with clearly specified objectives and audiences in mind. In this study most of the analysis of the films was accomplished by looking at the finished product—the release print of each film. Because of this limitation, some operational generalizations could not be analyzed thoroughly or, in some cases, not at all. A productive field of future research might be to actually observe the design process that some of the top producers go through in planning and producing an instructional film.

8. It might be possible to explore the effect on creativity and on the instructional quality of finished films by using a programmed learning approach to expose a group of film students to the operational generalizations derived in this study. Other groups may be taught the making of instructional films using more conventional methods.

In conclusion, it must be pointed out that film making is a highly creative activity. Comments running through much of the literature and the research and the comments of the Delphi panel in the present study emphasize the fact that "guidelines," "principles," or
operational generalizations" on film design should not be applied systematically to a particular film. They should, instead, be known by the film designer and used when appropriate to achieve a particular instructional objective.

In addition to being a highly creative activity, film making is also both an art and a science. The art of film making has reached a high level of sophistication. Mechanical aspects of the science of film making are also well advanced, but the science of design of instructional films is in its early developmental stages. It was encouraging to find in the present investigation that the majority of the sample of films judged to be outstanding did show evidence of the use of the majority of the derived operational generalizations, but there were some major disappointments. The majority of the films in the final sample of twenty were not designed for instructional use, but were adapted through use for instruction. Even some of the films that were designed for use by school audiences were designed and produced without specific objectives in mind. And none of the films in the sample were field-tested prior to release.

The science of the design of instructional films needs to be developed. Some progress has been made, but largely at the theoretical level. Any scheme or model developed will have to balance the science of film making with the art of film making and in the end
creativity must not be stifled—an extremely difficult task, perhaps even impossible, but certainly a challenge for the years ahead!
APPENDIX A

FLEMING'S PRINCIPLES FOR THE DESIGN OF INSTRUCTIONAL MATERIALS
APPENDIX A

FLEMING'S PRINCIPLES FOR THE DESIGN OF INSTRUCTIONAL MATERIALS

The following is a list of perceptual principles for the design of instructional materials that Fleming synthesized from research on perception. Principles taken from Fleming that were stated in Chapter III are not repeated here.

1. First, man's perception is relative rather than absolute, . . .

2. Perceived levels of stimulation are relative to immediate past experience which serves as an anchor or reference point in judging subsequent stimulation.

3. Where immediate past experience is at a high level new stimulation may be underestimated, where immediate past experience is at a low level new stimulation may be overestimated.

4. Man's perceptions are organized. He does not perceive chaotic arrays of different brightnesses, colors, temperatures, and noises, except perhaps at a discotheque. Rather, he perceives relationships, groupings, objects, events, words, and people.

5. The organization of a stimulus markedly influences the speed and accuracy of perception.
6. The first and perhaps the simplest organization is that of "figure and ground." Within a fraction of a second the visual system organizes the visual field into one or more figures which appear to stand out against a background or ground. Similarly, sounds are divided into figure and ground--concert music is figure, and sound of the air conditioner is ground.

7. Stimulus figures that are incomplete may be completed by the perceiver. This is called closure, for the perceiver closes or completes what are objectively open or incomplete figures.

8. Perceptual organization is affected not only by the stimulus but by the perceiver's past experiences, present interests and needs.

9. Man perceives what he expects or is "set" to perceive. This influences both what he selects and how he organizes and interprets it.

10. Particularly where sensory data are ambiguous or unfamiliar, there is room and need for expectations and motives to govern interpretation.

11. Set can influence the number of alternative interpretations of a message which an audience is likely to make. It thus in effect can influence the amount of information transmitted.

12. There appear to be stable individual differences in perceptual tendencies across a variety of test situations.

13. There is some evidence that a phenomenon called perceptual defense operates to reduce perception of disliked or threatening objects or events.
14. Perceptual development tends to proceed from an emphasis on the more concrete attributes or features of objects to the more abstract characteristics of groupings, patterns, and relationships.

15. Preattentive vision is largely peripheral and is wide angle. It provides a global, wholistic view of the visual field in which figures are separated from each other and located with reference to each other.

16. Attentive vision is largely foveal and is narrow angle. It builds from the elemental to the complex in a process of analysis and synthesis in which figures are given full detail, color, shape.

17. One form of stimulus control of visual attention is by a change in preattention, i.e., by the changes to which peripheral vision is most sensitive; brightness changes, movement. Similarly, auditory attention could be controlled by changes in volume, pitch, direction.

18. Man directs his attention where he will, i.e., where his interest, experience, and needs suggest.

19. In directing his attention, man seeks a balance between novelty and familiarity, between complexity and simplicity, between uncertainty and certainty.

20. Information is not simply transferred intact from the environment or from other humans to the perceiver. It is transduced, translated, transformed into something else that stands for it, i.e., it is coded.

21. A change in stimulation is necessary for sustained sensitivity and normal functioning.
22. The amount of change in energy necessary to effect a just-noticeable difference varies directly with the initial amount of energy present.

23. In general, the order of preference among Western peoples is: blue, red, green, purple, orange, and yellow.

24. Apparent brightness and color are influenced by adjacent brightness and color, and this adjacency can be either side-by-side in space or one-after-other in time.

25. Certain kinds of stimulus features, such as contours, are accentuated in perception, while others, such as uniform areas, are not.

26. Horizontal and vertical lines are perceptually more stable than lines at other orientations.

27. Lines seem to carry information by way of the following: location of the point of origin, curvature (if any), direction, length, point of change (angle or arc), terminus, or continuation with another line.

28. The figural portion of a stimulus—such as a person, object, or word—is given more attention, is perceived as solid and well-defined, and appears to be in front of the ground. The common contour between figure and ground belongs to the figure. In contrast, the ground attracts less attention, is perceived as amorphous and indefinitely defined, and appears to be behind the figure. The perception of a figure and a ground appears to be a rapid and spontaneous initial part of the analysis-by-synthesis process.
29. A given contour can belong to only one of the two areas it bounds and shapes, and whichever side it shapes will be perceived as figure. The most definitive characteristic of a figure is its boundedness. "Good figures" are closed; they exhibit a continuous contour. And of the closed areas in a field, the smaller and the more symmetrical will be more likely to be perceived as figures.

30. Where lines or contours are overlapping or competing with each other, the emerging figure will tend to be the one with good continuation, i.e., having more continuous and uninterrupted straight lines or smoothly-curving contours.

31. Where alternative figures can be constructed by a perceiver, the most likely will be the simplest and most symmetrical figure which the available stimuli allow.

32. The perceived complexity of figures can be estimated to a large degree with reference to such features as lines and angles, or more specifically, the overall number of such features and the number of different kinds of such features.

33. In general, the perceptual modality used in the final testing or application situation should be the modality employed during instruction.

34. Digital messages (words, numbers) can be perceived through either auditory or visual modalities or both. Iconic messages can only be perceived through vision, except for the occasional iconic sound.

35. The relative utility of each sign type is in part determined by the duration of perception (called short-term memory) and the available output capabilities. Digital signs have distinct advantages on both counts.
36. Partially compensating for the output advantages of digital signs are two aspects of iconic presentations:

1. They can be (usually are) recoded by the perceiver into digital form (name or description) and as such can readily be output.

2. They are usually available to the senses longer than digital signs in auditory modality, thus renewing short-term iconic memory much as subvocal rehearsal renews short-term digital memory.

37. There is considerable evidence that concrete words are better remembered than abstract words.

38. In general, instruction for the new learner in a subject area should begin with the more concrete messages and move to the more abstract as the learner proceeds to higher levels of the subject. This principle holds for learners of all ages.

Additionally, the degree of concreteness at any level of a subject matter should be greater for the first grader than for the twelfth grader.

39. An effective combination of digital signs usually is a more concrete word as stimulus and a less concrete word as response.

40. An individual can perceive at a glance up to about seven items. That is, for familiar objects he can report some attributes about them: number, name. Similarly, an individual can store in immediate memory up to about seven familiar items.

41. In general, the perceiver partitions the available information into as large or as appropriate an item size as the stimulus and his experience and intention allow. He is said to chunk or cluster or group.
42. The better organized or patterned a message is perceived to be, the more information the observer can receive (and process) at one time and/or the better he will retain what is perceived.

43. For verbal materials in a single channel situation, the visual channel (printed message) appears to have greater capacity than the auditory channel (spoken message). At least, it seems clear that the more difficult or complex the verbal material the greater the advantage of the visual channel over the auditory.

44. Objects and events perceived as different, as standing in contrast along one or more dimensions, will tend to be distinguished from each other and be separately grouped in perception.

45. Objects and events perceived as similar, in any of a number of ways such as appearance, function, quantity, direction, change, and structure, will tend to be grouped or organized together in perception.

46. Once a figure or pattern is fully distinguished from its ground and organized, the various elements within it tend to be perceived as more homogeneous than they in fact are. Further, distinctions between one figure and another may become accentuated.

47. Objects and events encountered in proximity with each other, i.e., close together in time or space or in the same context, will tend to be perceived as somehow related. Both similarities and differences may become apparent.

48. Familiar objects maintain many of their perceived characteristics (brightness, size, shape, color) almost independently of changes in stimulus conditions. This phenomenon is called perceptual constancy.
49. Perceptual grouping will be facilitated where objects and events are encountered as comprising or contributing to a common idea, pattern, rhythm, structure, or organization.

50. A variety of spatial arrangements, patterns, or structures influence the perception and learning of relationships.

51. A variety of temporal arrangements, patterns, or structures influence the perception and learning of relationships.

52. The simultaneous presentation of related material may frequently be superior to successive presentation.

53. A variety of configurations influence the perception and learning of relationships.

54. The more nearly a string of words approximates English word order, the more readily it is perceived and learned. Although novel word orders may be useful in attracting attention, they are not perceived and recoded as readily as normal word orders.

55. Words imbedded in a sentence or paragraph are more readily associated than those encountered in isolation.

56. Perceived size is reciprocally related to perceived distance, and vice versa, i.e., the greater the size the less the distance and the greater the distance the less the size.

57. The sizes of unfamiliar objects are perceived as relative to that of familiar objects.
58. The perception of depth in two-dimensional displays is influenced by the following: relative size (especially of familiar objects), linear perspective, texture gradient, upward angular location of grounded objects, superimposition.

59. The perception of depth in an object is markedly influenced by the illumination and the sharpness of image features.

60. Spatial perception is strongly oriented relative to the vertical and horizontal.

61. Ordinarily, the perception of time durations and time intervals is relatively inaccurate without a standard or frame of reference.

62. Time that is filled with activity appears to move more rapidly than time that is not.

63. The relation of figure to ground is particularly determinative of motion perception.

64. The better an object or event is perceived, according to the principles of perception, the better it will be remembered.

65. Stimulus conditions are important determiners of the efficiency of concept formation.

66. Problem solution can be facilitated by instructions which develop a relevant set toward the problem and by situational support which emphasizes or groups the crucial elements or reveals the crucial relations in the situation.
67. Provision of situational support for problem solving can take the form not only of relevant information but also of opportunity to record, test, and manipulate various alternatives.

68. The development of creative behavior is facilitated by materials which increase sensitivity to the attributes or features of the environment (objects, events, relations, people), and which encourage and give practice with alternative ways of dealing with that environment under low risk conditions.¹

APPENDIX B

BIBLIOGRAPHY OF RESEARCH REVIEWS STUDIED IN AN ATTEMPT TO FIND RESEARCH-BASED GENERALIZATIONS ON THE DESIGN OF INSTRUCTIONAL FILMS
APPENDIX B

BIBLIOGRAPHY OF RESEARCH REVIEWS STUDIED IN AN ATTEMPT TO FIND RESEARCH-BASED GENERALIZATIONS ON THE DESIGN OF INSTRUCTIONAL FILMS

Listed below are the research reviews that were studied in an attempt to find research-based generalizations on the design of instructional films (arranged chronologically).


APPENDIX C

QUESTIONNAIRE SENT TO UNIVERSITY FILM PRODUCERS
Dear [Name],

Your name was given to me by Dr. Robert W. Wagner, Chairman of the Department of Photography and Cinema at Ohio State University. He identified you as being one of the key persons involved in university film production in the United States.

I am engaged in a research project for my Ph.D. dissertation which is an attempt to arrive at some operational generalizations on the elements of instructional film design. Three sources of data will be used: (1) a synthesis of generalizations drawn from experimental research, (2) a survey of instructional film producers, and (3) an analysis of twenty outstanding instructional films.

This letter is concerned with the second source of data. Selected university and commercial producers of instructional films will be surveyed by use of the Delphi Technique. Before employing this technique, I need to locate other key persons that are involved in influencing the design and production of instructional films. These individuals should have a considerable depth of knowledge (based on study, research, experience, or intuition) about what constitutes good design in instructional films. Once these individuals are identified, the Delphi Technique will be employed to draw upon their knowledge and intuitive judgment.

To further assist me in identifying these key individuals, would you please list the names and institutions of ten persons involved in university film production whom you consider to be the most experienced and knowledgeable in the area of designing instructional films. (Please use the space provided on the next page.)
In addition, would you please list the names of five or more individuals involved in commercial film production whom you consider to be among the most experienced and knowledgeable in the area of designing instructional films.

Name
1. __________________________________________
2. __________________________________________
3. __________________________________________
4. __________________________________________
5. __________________________________________
6. __________________________________________
7. __________________________________________
8. __________________________________________
9. __________________________________________
10. _________________________________________

Your cooperation is sincerely appreciated.

Sincerely,

William D. Schmidt
Graduate Research Associate

Please return this form in the enclosed envelope by July 30.
APPENDIX D

DELPHI QUESTIONNAIRES I, II, AND III
Dear

In a poll of selected members of the University Film Association, your name was frequently mentioned as being one of the "key persons experienced and knowledgeable in the area of designing instructional films."

The purpose of this letter is to solicit your assistance in a research project investigating the area of design elements involved in the production of instructional films. The research, for my Ph.D. in curriculum and media at Ohio State University, is entitled *Design Elements in Instructional Films: An Attempt to Derive Some Operational Generalizations from Three Sources of Data*. The sources that will be used are: (1) a synthesis of generalizations drawn from reviews of experimental research, (2) a survey of the opinion of instructional film producers, and (3) an analysis of twenty outstanding instructional films. The second source of data, and the one we are concerned with here, will involve the use of the Delphi Technique. The Delphi procedure to be used in this study will involve a total of three questionnaires. The first one is enclosed. If you are not familiar with Delphi, you may want to read the short description appended to this cover letter.

The intent of this research is not to establish a list of rules or principles for design of instructional films; the nature of film is such that it is not possible to devise such a list to be followed in "cookbook" fashion. The purpose is, instead, to draw together data from several areas to ascertain if there is any general agreement on specific design elements. The primary target audience of the completed research is not specialists like yourself, but rather novice or inexperienced
instructional film makers. As such, the results of this study can be a step toward putting these individuals in closer contact with state-of-the-art evidence and thinking. The resulting data, synthesized into operational generalizations, can be used to suggest critical areas in film design where decisions must be made rather than to tell what decisions to make.

It is felt that the informed intuitive judgment of recognized experts in the design of instructional films can provide a significant source of data, and one that is not now readily available. Delphi seems to hold considerable promise for eliciting this type of information.

Since I am using a small group as a Delphi panel, it is important that I get a high percentage of returns. Your investment of ten minutes with each of the questionnaires is sincerely appreciated. Delphi Questionnaire I is attached. Each participant will be furnished with a copy of the final outcome of the Delphi survey.

Sincerely,

William D. Schmidt
Associate Professor and
Coordinator of Media
Production Services
The Delphi Technique was originally developed twenty years ago at the RAND Corporation by Olaf Helmer and his associates, but it was only seven years ago that it was released for use by other organizations. Today hundreds of corporations and a few educational institutions are experimenting with its use.

Delphi is a method of arriving at consensus without bringing the experts or participants together face-to-face. Numerous writers have concluded that meetings and conferences are frequently ineffective ways of arriving at rational decisions. It is theorized that professional status and position often interfere with consensus formulation in group deliberations. With the Delphi Technique, each person is consulted individually through successive rounds of questionnaires. The intent is to progressively arrive at more carefully considered group opinions. Finally, a consensus of opinion, or at least a majority and minority opinion, is derived.

While the Delphi Technique was originally designed to be used in forecasting future events, it has been used by educational institutions to consider needed reforms and innovation, to develop the curriculum for a new branch campus, to collect data for changing a teacher education program, and to collect data for changing a county school district in Ohio.
Name_______________________________________*

Institution or Firm________________________________________* 

DELPHI QUESTIONNAIRE I

Listed below are twenty-three statements on the subject of design of instructional films. These statements were derived from a synthesis of generalizations drawn from reviews of experimental research. The participant is asked to react to each statement using as a criterion his informed intuitive judgment as an instructional film designer.

The participant is also asked to think in terms of instructional films rather than broadly educational films, i.e., films that involve a high degree of preplanning and that are aimed at attaining selected and specific goals of instruction as opposed to theatrical, sponsored, and "educational" films which may educate on a very general basis. Lastly, please consider these statements in a general sense rather than in specific terms: realizing the unique character of every film and the possible interactions among design elements within films would not in every case make the selected reaction apply. They would apply, however, in the majority of cases.

PART A

Considering instructional films (rather than broadly educational films), please react to the following statements as they would apply in the majority of cases to the design of instructional films. Please indicate your agreement or disagreement with each statement by checking the appropriate space.

*Names of individuals, institutions, or firms will not be used in the dissertation tabulations. They are needed, however, to direct the other two questionnaires to the appropriate person.
Audience Involvement Elements

1. Since viewers perceive and respond selectively to motion pictures, instructional films should be prepared with a specific audience in mind, i.e., the film should accommodate the wants, feelings, interests, experiences, and perceptual tendencies of a well-defined viewer group.

____ Agree ______ Disagree

2. Audience participation and/or practice (either overt or covert) during a film presentation can improve learning if it is appropriate to the learning task and if it does not constitute an interference with the film's message.

____ Agree ______ Disagree

3. During a film presentation involving student participation, learning can be improved if a student is supplied with a knowledge of results about his performance.

____ Agree ______ Disagree

4. The subjective camera view should be used in training subjects to perform a perceptual motor task, i.e., show a performance or demonstration on the screen the way the learner would see it rather than from the view of a bystander.

____ Agree ______ Disagree

Picture and Sound Elements

5. A pictorial stimulus and a verbal response or label appears to be the most effective arrangement of pictorial and verbal material.

____ Agree ______ Disagree

6. Pictures are often ambiguous without the use of words, i.e., the picture needs the word as often as the word needs the picture.

____ Agree ______ Disagree
7. The visual and audio elements have a greater combined effect than either one alone, provided the two elements are relevant to each other.

___ Agree  ___ Disagree

8. Vision is a sense that is best for spatial distinctions (e.g., mountain, mile, cube, and leaf shape), but relatively poor for temporal distinctions.

___ Agree  ___ Disagree

9. Audition (the sense of hearing) is best for temporal distinctions (e.g., rhythm, sequence, frequency, music, or speech), but relatively poor for spatial distinctions.

___ Agree  ___ Disagree

10. If a concept involves both time and space (e.g., plant growth, life cycles, erosion, city, and the westward movement), use both vision and audition.

___ Agree  ___ Disagree

11. Vision is a sense that is best when it is desirable to hold a message in the perceptual field of an audience for some time. With audition, repetition is required for critical examination.

___ Agree  ___ Disagree

12. The visual mode is a less ambiguous mode of transmission than is the auditory.

___ Agree  ___ Disagree

13. Attention-gaining devices

a. While man's attention is known to be drawn to that which is novel and complex, attention-gaining devices as used in instructional films apparently add little to an otherwise well-made film. (Some examples are zooms, music, extreme magnification, and stop motion.)

___ Agree  ___ Disagree
b. Devices which call attention to irrelevant materials may interfere with the learning of more important items.

____ Agree ______ Disagree

14. Attention-directing devices (e.g., animation techniques, color, close-ups, slow or fast motion, unusual sounds, and the use of selected camera angles) may aid learning by calling attention to relevant parts of a visual which may otherwise be overlooked.

____ Agree ______ Disagree

15. Color:

a. Color in instructional films has not been demonstrated to produce any general over-all increased learning in comparison with black-and-white films, except when the learning involved a color discrimination.

____ Agree ______ Disagree

b. Color can in some cases prove to be a distracting influence.

____ Agree ______ Disagree

c. There is some evidence that color should be used in media design, but the nature of its precise effect can, perhaps, not be assessed in terms of measurable outcomes of learning.

____ Agree ______ Disagree

16. Film Commentaries:

a. Film commentaries should be simplified as much as possible.

____ Agree ______ Disagree

b. The commentary should avoid the use of unfamiliar names or technical terms.

____ Agree ______ Disagree
17. Film Narrations:

a. Film narrations should be designed so as to not have either too little or too much talk. In determining the right amount of talk, complexity of the material and the intellectual level of the audience must be taken into account.

Agree  Disagree

b. For relatively simple materials involving narration only, listening comprehension is likely to be most effective at speeds around 160 words a minute. When the narration is accompanied by video, the optimum rate appears to be lower.

Agree  Disagree

18. In the narration of an instructional film, the active form of sentence structure is preferable to the passive form.

Agree  Disagree

19. In instructional films, still pictures may sometimes replace the use of moving pictures, and be equally as effective and less expensive.

Agree  Disagree

20. The visual image should be simplified as much as possible. Only the most relevant and necessary attributes should be included in the image. All irrelevant attributes should be excluded.

Agree  Disagree

Film Structure Elements

21. Rate of Development:

a. Because man is a selective perceiver and is limited in the amount of information he can process, the rate of development of a film should be slow enough to permit him to grasp the material as it is shown.

Agree  Disagree
b. The rate of development should be even slower at points at which it is necessary for the viewer to change attention from one source to another.

____ Agree  ______ Disagree

22. Introductions and Summaries:

a. Introductory and summary material in a film may increase the amount of learning.

____ Agree  ______ Disagree

b. The main function of introductions is to alert the audience as to what to expect and to thereby direct attention to relevant features. Summaries serve to restate and re-emphasize the main points.

____ Agree  ______ Disagree

23. The effectiveness of a film can be improved by organizing it so that important sequences or concepts are repeated by depicting the same idea in several ways.

____ Agree  ______ Disagree

PART B

Other Design Considerations:

Listed below are some other elements that are often considered when designing instructional films. Research is inconclusive in most of these areas. Please make some comment about how you feel in regard to each of these design considerations (one sentence or two at the most in each case). This section has the potential of capitalizing on the strengths of the Delphi process. Please use the space provided.

1. Use of optical effects (fades, dissolves, etc.)

2. Use of music.

4. Need for photographic realism vs. use of line drawings or cartoons.

5. Need for frame of reference for size and time dimensions.

6. Need for relating content to specific instructional objectives.

7. Specific content vs. general content in films.

8. Use of dramatic sequences.

9. Showing of errors.

Additional Statements:

Please list any other factors that you feel are important for the novice film maker to know in designing instructional films.

1.

2.

3.

4.

5.
Dear

I sincerely appreciate your willingness to participate in the Delphi Survey on Instructional Film Design. Enclosed is the second of the three questionnaires that you will receive. Please don't let the length of this questionnaire scare you as the longest portion (Part A) requires responses only to a limited number of the total list of items. Since Parts A and B require slightly different types of responses, instructions will be given at the beginning of each part.

The third (and final) questionnaire will supply you with a consensus indication plus a summary of all the minority opinions regarding each statement about instructional film design.

Kindly return the enclosed questionnaire by February 9, 1972. A self-addressed, stamped envelope is enclosed for your convenience.

Sincerely,

William D. Schmidt
Associate Professor and
Coordinator of Media
Production Services
Name ______________________________________________ **

Institution or Firm ______________________________________________ **

DELPHI QUESTIONNAIRE II

PART A

Directions: Part A of Delphi Questionnaire II is a duplicate of Part A of Delphi Questionnaire I except that for each statement Delphi II indicates the consensus* of the group who completed the first questionnaire (enclosed in a black square). In addition, wherever your response was outside the consensus, that response is encircled in red.

The purpose of duplicating Part A of the questionnaire is to allow you to reconsider your previous responses to those items in which you are not in general agreement with others who are participating in this survey. Hence, in Part A, you need only consider those statements where a response is encircled in red. (This applies to Part A only.) Minority opinions expressed through the Delphi process have the potential for providing some insightful views into the process of designing instructional films. Consequently, if you wish to remain outside of the consensus, your task is to briefly indicate the primary reason in the "Comments" space. If in Delphi I, you gave any reasons for individual responses, I have transcribed those comments on your copy of Delphi II. I shall assume that for any item where your initial response was outside the consensus, and for which you have not listed a reason, that you wish your rating to be changed to a consensus rating.

Please remember that the instructions for Delphi I were as follows: "Considering instructional films (rather than broadly educational films), react to the following statements as they would apply in the majority of cases to the design of instructional films. Please indicate your agreement or disagreement with each statement by

*Consensus here is defined as the majority of opinion (the number larger than half the total).

**Names of individuals, institutions, or firms will not be used in the dissertation tabulations.
checking the appropriate space." Furthermore, you were asked to react to each statement using as a criterion your informed intuitive judgment as an instructional film designer.

Consensus [ ] Your Response

**Audience Involvement Elements**

1. Since viewers perceive and respond selectively to motion pictures, instructional films should be prepared with a specific audience in mind, i.e., the film should accommodate the wants, feelings, interests, experiences, and perceptual tendencies of a well-defined viewer group.

   [ ] Agree  [ ] Disagree  Comments:

2. Audience participation and/or practice (either overt or covert) during a film presentation can improve learning if it is appropriate to the learning task and if it does not constitute an interference with the film's message.

   [ ] Agree  [ ] Disagree  Comments:

3. During a film presentation involving student participation, learning can be improved if a student is supplied with a knowledge of results about his performance.

   [ ] Agree  [ ] Disagree  Comments:

4. The subjective camera view should be used in training subjects to perform a perceptual motor task, i.e., show a performance or demonstration on the screen the way the learner would see it rather than from the view of a bystander.

   [ ] Agree  [ ] Disagree  Comments:

**Picture and Sound Elements**

5. A pictorial stimulus and a verbal response or label appears to be the most effective arrangement of pictorial and verbal material.

   [ ] Agree  [ ] Disagree  Comments:
6. Pictures are often ambiguous without the use of words, i.e., the picture needs the word as often as the word needs the picture.

____ Agree  ____ Disagree  Comments:

7. The visual and audio elements have a greater combined effect than either one alone, provided the two elements are relevant to each other.

____ Agree  ____ Disagree  Comments:

8. Vision is a sense that is best for spatial distinctions (e.g., mountain, mile, cube, and leaf shape), but relatively poor for temporal distinctions.

____ Agree  ____ Disagree  Comments:

9. Audition (the sense of hearing) is best for temporal distinctions (e.g., rhythm, sequence, frequency, music, or speech), but relatively poor for spatial distinctions.

____ Agree  ____ Disagree  Comments:

10. If a concept involves both time and space (e.g., plant growth, life cycles, erosion, city, and the westward movement), use both vision and audition.

____ Agree  ____ Disagree  Comments:

11. Vision is a sense that is best when it is desirable to hold a message in the perceptual field of an audience for some time. With audition, repetition is required for critical examination.

____ Agree  ____ Disagree  Comments:

12. The visual mode is a less ambiguous mode of transmission than is the auditory.

____ Agree  ____ Disagree  Comments:

13. Attention-Gaining devices:

   a. While man's attention is known to be drawn to that which is novel and complex, attention-gaining devices as used in
instructional films apparently add little to an otherwise well-made film. (Some examples are zooms, music, extreme magnification, and stop motion.)

____ Agree   ____ Disagree Comments:

   b. Devices which call attention to irrelevant materials may interfere with the learning of more important items.

____ Agree   ____ Disagree Comments:

14. Attention-directing devices (e.g., animation techniques, color, close-ups, slow or fast motion, unusual sounds, and the use of selected camera angles) may aid learning by calling attention to relevant parts of a visual which may otherwise be overlooked.

____ Agree   ____ Disagree Comments:

15. Color:

   a. Color in instructional films has not been demonstrated to produce any general over-all increased learning in comparison with black-and-white films, except when the learning involved a color discrimination.

____ Agree   ____ Disagree Comments:

   b. Color can in some cases prove to be a distracting influence.

____ Agree   ____ Disagree Comments:

   c. There is some evidence that color should be used in media design, but the nature of its precise effect can, perhaps, not be assessed in terms of measurable outcomes of learning.

____ Agree   ____ Disagree Comments:

16. Film Commentaries:

   a. Film commentaries should be simplified as much as possible.

____ Agree   ____ Disagree Comments:
b. The commentary should avoid the use of unfamiliar names or technical terms.

[Agree] [Disagree] Comments:

17. Film Narrations:

   a. Film narrations should be designed so as to not have either too little or too much talk. In determining the right amount of talk, complexity of the material and the intellectual level of the audience must be taken into account.

[Agree] [Disagree] Comments:

   b. For relatively simple materials involving narration only, listening comprehension is likely to be most effective at speeds around 160 words a minute. When the narration is accompanied by video, the optimum rate appears to be lower.

[Agree] [Disagree] Comments:

18. In the narration of an instructional film, the active form of sentence structure is preferable to the passive form.

[Agree] [Disagree] Comments:

19. In instructional films, still pictures may sometimes replace the use of moving pictures, and be equally as effective and less expensive.

[Agree] [Disagree] Comments:

20. The visual image should be simplified as much as possible. Only the most relevant and necessary attributes should be included in the image. All irrelevant attributes should be excluded.

[Agree] [Disagree] Comments:
Film Structure Elements

21. Rate of Development:
   a. Because man is a selective perceiver and is limited in the amount of information he can process, the rate of development of a film should be slow enough to permit him to grasp the material as it is shown.

   ___ Agree ___ Disagree   Comments:

   b. The rate of development should be even slower at points at which it is necessary for the viewer to change attention from one source to another.

   ___ Agree ___ Disagree   Comments:

22. Introductions and Summaries:
   a. Introductory and summary material in a film may increase the amount of learning.

   ___ Agree ___ Disagree   Comments:

   b. The main function of introductions is to alert the audience as to what to expect and to thereby direct attention to relevant features. Summaries serve to restate and re-emphasize the main points.

   ___ Agree ___ Disagree   Comments:

23. The effectiveness of a film can be improved by organizing it so that important sequences or concepts are repeated by depicting the same idea in several ways.

   ___ Agree ___ Disagree   Comments:
PART B

Directions: Listed below are some additional statements on the subject of design of instructional films. These statements were derived from a synthesis of comments made by you and other respondents to Part B of Delphi I. You are asked to react to each statement using as a criterion your informed intuitive judgment as an instructional film designer.

You are also asked to think in terms of instructional films rather than broadly educational films, i.e., films that involve a high degree of preplanning and that are aimed at attaining selected and specific goals of instruction as opposed to theatrical, sponsored, and "educational" films which may educate on a very general basis. Lastly, please consider these statements in a general sense rather than in specific terms; realizing the unique character of every film and possible interactions among design elements within films would not in every case made the selected reaction apply. They would apply, however, in the majority of cases.

Considering instructional films (rather than broadly educational films), please react to the following statements as they would apply in the majority of cases to the design of instructional films. Please indicate your agreement or disagreement with each statement by checking the appropriate space. In addition, if you disagree with a statement, succinctly write the reason for disagreeing in the space provided after each statement.

1. Optical effects (fades, dissolves) contribute little to the informational content of an instructional film, . . .

   ____ Agree  ____ Disagree  If disagree, the reason is:
   a. . . . but they can serve as a form of punctuation . . .

   ____ Agree  ____ Disagree  If disagree, the reason is:
   b. . . . can make the producer's job easier . . .

   ____ Agree  ____ Disagree  If disagree, the reason is:
   c. . . . and can make an aesthetic contribution to a film.

   ____ Agree  ____ Disagree  If disagree, the reason is:
2. In instructional films dealing with content which involves the affective domain (learning dealing with feeling states associated with attitudes, values, and appreciations), the main contribution of music is to set the mood and pace.

____ Agree  ____ Disagree  If disagree, the reason is:

3. Other than the contribution cited in the previous statement, music generally adds little to the informational content of an instructional film.

____ Agree  ____ Disagree  If disagree, the reason is:

4. The use of title and introductory music is probably justifiable from an aesthetic standpoint.

____ Agree  ____ Disagree  If disagree, the reason is:

5. When in doubt about the probable effect of music in an instructional film, good advice is to leave it out.

____ Agree  ____ Disagree  If disagree, the reason is:

6. While the optimum length of a film depends on the subject and the audience, an instructional film should seldom exceed 20 to 25 minutes.

____ Agree  ____ Disagree  If disagree, the reason is:

7. Whenever dealing with objects unfamiliar to the intended audience, some frame of reference is needed for size and time dimensions.

____ Agree  ____ Disagree  If disagree, the reason is:

8. It is essential that content in instructional films be related to specific instructional objectives.

____ Agree  ____ Disagree  If disagree, the reason is:

9. General content is of little value in an instructional film as the learner needs specific information.

____ Agree  ____ Disagree  If disagree, the reason is:
10. Dramatic sequences in instructional films should only be used when the subject clearly calls for it and then only when it can be done skillfully.

____ Agree  ____ Disagree  If disagree, the reason is:

11. Drama, when necessary, should be used primarily to promote affective learning (learning dealing with feeling states associated with attitudes, values, and appreciations), rather than cognitive learning (learning dealing with knowledge concepts, ideas, or principles).

____ Agree  ____ Disagree  If disagree, the reason is:

12. The use of negative examples through the showing of errors in instructional films can be effective in the following situations:

(a) If the subject matter deals with the affective domain.

____ Agree  ____ Disagree  If disagree, the reason is:

(b) If a carefully prepared discussion follows the film.

____ Agree  ____ Disagree  If disagree, the reason is:

(c) If the natural consequences of the error are shown along with a better alternative.

____ Agree  ____ Disagree  If disagree, the reason is:

(d) If the correct method has been clearly established and practiced by the learner.

____ Agree  ____ Disagree  If disagree, the reason is:

13. Some good arguments against the use of negative examples follow:

(a) The visual impact is too great and some, who are daydreaming, might think the error is the approved way of doing things.

____ Agree  ____ Disagree  If disagree, the reason is:
(b) Only a good comic can make errors seem human without being a challenge for imitation.

____ Agree     ____ Disagree     If disagree, the reason is:

14. The strength of an instructional film should be primarily in the visual elements and secondarily in the narration and other audio elements.

____ Agree     ____ Disagree     If disagree, the reason is:

15. It is important that an instructional film maker understand the language of sound motion pictures and be aware of the fact that this language may undergo changes from time to time.

____ Agree     ____ Disagree     If disagree, the reason is:

16. When designing an instructional film, a major consideration must be to simplify and clarify the message as much as possible.

____ Agree     ____ Disagree     If disagree, the reason is:

17. The instructional film maker must carefully assess his audience's level of ability.

____ Agree     ____ Disagree     If disagree, the reason is:

18. The instructional film maker must research his subject well.

____ Agree     ____ Disagree     If disagree, the reason is:

19. The instructional film narrator should not talk down or lecture to his audience.

____ Agree     ____ Disagree     If disagree, the reason is:

20. The basic communication model of "WHO says . . . WHAT to . . . WHOM and for WHAT PURPOSE" is a useful formula to follow in designing instructional films.

____ Agree     ____ Disagree     If disagree, the reason is:
21. Instructional films should be field tested . . .

(a) . . . by trying out ideas in script or storyboard form and if possible in rough cut form . . .

____ Agree  ____ Disagree  If disagree, the reason is:

(b) . . . by using sample audiences with opportunity for revision.

____ Agree  ____ Disagree  If disagree, the reason is:

22. Statements about instructional film design which are based on research and on producer opinion should not be applied to film making in a narrow and simplistic fashion. As was pointed out in one of the reports of the Pennsylvania State University's Instructional Film Research Program, such statements can best be used to suggest critical areas in film design where decisions must be made rather than to tell what decisions to make.

____ Agree  ____ Disagree  If disagree, the reason is:

PLEASE RETURN QUESTIONNAIRE IN THE ENCLOSED ENVELOPE BY FEBRUARY 9, 1972.
Dear

Your assistance in bringing us to Delphi Questionnaire III is sincerely appreciated. This final step in the process includes a listing of comments and opinions of other participants in the group. Based on this type of feedback, you are asked to make a final reassessment of your opinion of each of the statements on the design of instructional films.

Kindly return the enclosed questionnaire by April 14. A self-addressed, stamped envelope is enclosed for your convenience. Please do not return the Comments/Opinions List.

You will be supplied with a compilation of the final results of this survey upon complete tabulation. Thank you again for your patience and cooperation.

Sincerely,

William D. Schmidt
Associate Professor and
Coordinator of Media
Production Services
Name ____________________________________________ *
Institution ____________________________________________ *

DELPHI QUESTIONNAIRE III

Directions: The statements listed in Parts A and B of Delphi Questionnaire III are duplicates of the statements listed in Delphi II (with a few exceptions which will be explained later in Part B). The consensus** rating for each statement is enclosed in a black square. Whenever your response was outside the consensus of the group, that response is encircled in red. In addition, a complete listing of comments and opinions for individual statements is enclosed. To help you to quickly identify any statement which evoked no comments or opinions, the following symbol will precede it: (-).

The purpose of this final step in the Delphi process is to provide you with the opportunity of rating each statement with the knowledge of both the consensus rating and the comments and opinions of others involved in the survey. The participant is cautioned to weigh the predominantly negative comments against the generally silent consensus group. Except in a few cases, the consensus group was not asked to give reasons for their choices (although some volunteered comments). Furthermore, in 59 of 60 cases participants were asked why they disagreed with a statement rather than why they agreed.

In this final round, please try to indicate general agreement or disagreement with the statements as stated, rather than by editing or revising the statements. Please use the following directions in marking Parts A and B:

1. Where you wish to change one of your previous ratings, simply encircle your new choice (i.e., encircle either "agree" or "disagree").

2. Where you do not wish to change a previous rating, simply do nothing and move on to the consideration of the next statement.

*Names of individuals, institutions, or firms will not be used in the dissertation tabulations.
**Consensus here is defined as the majority of opinion (the number larger than half the total).
Please remember that the instructions for Delphis I and II were as follows: "Considering instructional films (rather than broadly educational films), react to the following statements as they would apply in the majority of cases to the design of instructional films. Please indicate your agreement or disagreement with each statement by checking the appropriate space." Furthermore, you were asked to react to each statement using as a criterion your informed intuitive judgment as an instructional film designer.

Consensus □ Your Response

PART A

Audience Involvement Elements

(-) 1. Since viewers perceive and respond selectively to motion pictures, instructional films should be prepared with a specific audience in mind, i.e., the film should accommodate the wants, feelings, interests, experiences, and perceptual tendencies of a well-defined viewer group.

[ ] Agree  [ ] Disagree

(-) 2. Audience participation and/or practice (either overt or covert) during a film presentation can improve learning if it is appropriate to the learning task and if it does not constitute an interference with the film's message.

[ ] Agree  [ ] Disagree

(-) 3. During a film presentation involving student participation, learning can be improved if a student is supplied with a knowledge of results about his performance.

[ ] Agree  [ ] Disagree

(-) 4. The subjective camera view should be used in training subjects to perform a perceptual motor task, i.e., show a performance or demonstration on the screen the way the learner would see it rather than from the view of a bystander.

[ ] Agree  [ ] Disagree
Picture and Sound Elements

5. A pictorial stimulus and a verbal response or label appears to be the most effective arrangement of pictorial and verbal material.

[ ] Agree  [ ] Disagree

6. Pictures are often ambiguous without the use of words, i.e., the picture needs the word as often as the word needs the picture.

[ ] Agree  [ ] Disagree

(—) 7. The visual and audio elements have a greater combined effect than either one alone, provided the two elements are relevant to each other.

[ ] Agree  [ ] Disagree

8. Vision is a sense that is best for spatial distinctions (e.g., mountain, mile, cube, and leaf shape), but relatively poor for temporal distinctions.

[ ] Agree  [ ] Disagree

9. Audition (the sense of hearing) is best for temporal distinctions (e.g., rhythm, sequence, frequency, music, or speech), but relatively poor for spatial distinctions.

[ ] Agree  [ ] Disagree

10. If a concept involves both time and space (e.g., plant growth, life cycles, erosion, city, and the westward movement), use both vision and audition.

[ ] Agree  [ ] Disagree

11. Vision is a sense that is best when it is desirable to hold a message in the perceptual field of an audience for some time. With audition, repetition is required for critical examination.

[ ] Agree  [ ] Disagree
12. The visual mode is a less ambiguous mode of transmission than is the auditory.

____ Agree    _____ Disagree

13. Attention-gaining devices

a. While man's attention is known to be drawn to that which is novel and complex, attention-gaining devices as used in instructional films apparently add little to an otherwise well-made film. (Some examples are zooms, music, extreme magnification, and stop motion.)

____ Agree    _____ Disagree

(-) b. Devices which call attention to irrelevant materials may interfere with the learning of more important items.

____ Agree    _____ Disagree

(-) 14. Attention-directing devices (e.g., animation techniques, color, close-ups, slow or fast motion, unusual sounds, and the use of selected camera angles) may aid learning by calling attention to relevant parts of a visual which may otherwise be overlooked.

____ Agree    _____ Disagree

15. Color:

a. Color in instructional films has not been demonstrated to produce any general over-all increased learning in comparison with black-and-white films, except when the learning involved a color discrimination.

____ Agree    _____ Disagree

b. Color can in some cases prove to be a distracting influence.

____ Agree    _____ Disagree

c. There is some evidence that color should be used in media design, but the nature of its precise effect can, perhaps, not be assessed in terms of measurable outcomes of learning.

____ Agree    _____ Disagree
16. Film Commentaries:

a. Film commentaries should be simplified as much as possible.

____ Agree  ____ Disagree

b. The commentary should avoid the use of unfamiliar names or technical terms.

____ Agree  ____ Disagree

17. Film Narrations:

a. Film narrations should be designed so as to not have either too little or too much talk. In determining the right amount of talk, complexity of the material and the intellectual level of the audience must be taken into account.

____ Agree  ____ Disagree

b. For relatively simple materials involving narration only, listening comprehension is likely to be most effective at speeds around 160 words a minute. When the narration is accompanied by video, the optimum rate appears to be lower.

____ Agree  ____ Disagree

18. In the narration of an instructional film, the active form of sentence structure is preferable to the passive form.

____ Agree  ____ Disagree

19. In instructional films, still pictures may sometimes replace the use of moving pictures, and be equally as effective and less expensive.

____ Agree  ____ Disagree

20. The visual image should be simplified as much as possible. Only the most relevant and necessary attributes should be included in the image. All irrelevant attributes should be excluded.

____ Agree  ____ Disagree
Film Structure Elements

21. Rate of Development:

a. Because man is a selective perceiver and is limited in the amount of information he can process, the rate of development of a film should be slow enough to permit him to grasp the material as it is shown.

[ ] Agree [ ] Disagree

b. The rate of development should be even slower at points at which it is necessary for the viewer to change attention from one source to another.

[ ] Agree [ ] Disagree

22. Introductions and Summaries:

a. Introductory and summary material in a film may increase the amount of learning.

[ ] Agree [ ] Disagree

( ) b. The main function of introductions is to alert the audience as to what to expect and to thereby direct attention to relevant features. Summaries serve to restate and re-emphasize the main points.

[ ] Agree [ ] Disagree

23. The effectiveness of a film can be improved by organizing it so that important sequences or concepts are repeated by depicting the same idea in several ways.

[ ] Agree [ ] Disagree
PART B

Directions: Follow the same directions in Part B as you used in Part A. In this part, several statements have been slightly modified based on comments received in the previous questionnaire. The nature of the modification is explained in each case. The statements in question are numbers 2, 3, 10, 12d, 15, and 20. In most cases these modifications do not greatly change the meaning of the statement, but serve to further clarify its meaning.

Consensus [ ] Your Response

1. Optical effects (fades, dissolves) contribute little to the informational content of an instructional film, . . .
   — Agree  — Disagree
   a. . . . but they can serve as a form of punctuation . . .
   — Agree  — Disagree
   b. . . . can make the producer's job easier . . .
   — Agree  — Disagree
   c. . . . and can make an aesthetic contribution to a film.
   — Agree  — Disagree

2. In instructional films dealing with content which involves the affective domain (learning dealing with feeling states associated with attitudes, values, and appreciations), the main contribution of music is to help establish the mood and pace. (Changed by substituting "help establish" for "set.")
   — Agree  — Disagree

3. Other than the contribution cited in the previous statement, music generally adds little to the informational content of an instructional film; except, of course, when the film deals with the subject of music. (Changed by adding "except, of course, when the film deals with the subject of music.")
   — Agree  — Disagree
4. The use of title and introductory music is probably justifiable from an aesthetic standpoint.

____ Agree ______ Disagree

(-) 5. When in doubt about the probable effect of music in an instructional film, good advice is to leave it out.

____ Agree ______ Disagree

6. While the optimum length of a film depends on the subject and the audience, an instructional film should seldom exceed 20 to 25 minutes.

____ Agree ______ Disagree

(-) 7. Whenever dealing with objects unfamiliar to the intended audience, some frame of reference is needed for size and time dimensions.

____ Agree ______ Disagree

8. It is essential that content in instructional films be related to specific instructional objectives.

____ Agree ______ Disagree

9. General content is of little value in an instructional film as the learner needs specific information.

____ Agree ______ Disagree

10. Dramatic sequences in instructional films should only be used when the subject clearly calls for it and then only when it can be done skillfully. Dramatic sequences are here defined as portions of a film in which the story or content is acted out by actors. (Changed by adding the definition of dramatic sequences.)

____ Agree ______ Disagree
11. Drama, when necessary, should be used primarily to promote affective learning (learning dealing with feeling states associated with attitudes, values, and appreciations) rather than cognitive learning (learning dealing with knowledge concepts, ideas, or principles).

Agree  Disagree

12. The use of negative examples through the showing of errors in instructional films can be effective in the following situations:

a. If the subject matter deals with the affective domain.

Agree  Disagree

b. If a carefully prepared discussion follows the film.

Agree  Disagree

c. If the natural consequences of the error are shown along with a better alternative.

Agree  Disagree

d. If the correct method is or will be clearly established and practiced by the learner. (Changed by replacing "has been" with "is or will be.")

Agree  Disagree

13. Some good arguments against the use of negative examples follow:

a. The visual impact is too great and some, who are daydreaming, might think the error is the approved way of doing things.

Agree  Disagree

b. Only a good comic can make errors seem human without being a challenge for imitation.

Agree  Disagree
14. The strength of an instructional film should be primarily in the visual elements and secondarily in the narration and other audio elements.

___ Agree  ___ Disagree

15. It is important that an instructional film maker understand the language of sound motion pictures and be aware of the fact that this language may undergo changes from time to time. The "language of sound motion pictures" as used here refers to the conventions of the medium (i.e., various photographic and auditory effects and techniques, plus compositional and structural methods) and the way the conventions affect viewers. (Changed by adding the second sentence which defines language of sound motion pictures.)

___ Agree  ___ Disagree

16. When designing an instructional film, a major consideration must be to simplify and clarify the message as much as possible.

___ Agree  ___ Disagree

17. The instructional film maker must carefully assess his audience's level of ability.

___ Agree  ___ Disagree

(-) 18. The instructional film maker must research his subject well.

___ Agree  ___ Disagree

19. The instructional film narrator should not talk down or lecture to his audience.

___ Agree  ___ Disagree

20. The basic communication model of "WHO says ... WHAT to ... WHOM ... for WHAT PURPOSE and with WHAT EFFECT" is a useful formula to follow in designing instructional films. (Changed by adding "and with WHAT EFFECT." )

___ Agree  ___ Disagree
21. Instructional films should be field tested . . .

   a. . . . by trying out ideas in script or storyboard form and if possible in rough cut form . . .

   [ ] Agree [ ] Disagree

   b. . . . by using sample audiences with opportunity for revision.

   [ ] Agree [ ] Disagree

   (-) 22. Statements about instructional film design which are based on research and on producer opinion should not be applied to film making in a narrow and simplistic fashion. As was pointed out in one of the reports of the Pennsylvania State University's Instructional Film Research Program, such statements can best be used to suggest critical areas in film design where decisions must be made rather than to tell what decisions to make.

   [ ] Agree [ ] Disagree

PART C

This part concludes Delphi Questionnaire III. Its purpose is to obtain your general reaction to the comments of a number of individuals on the methods used in arriving at decisions in regard to the design of instructional films. These comments are reproduced below:

William H. Allen, 1959: "It is one thing to isolate certain variables under experimental laboratory conditions, yet quite another to get them incorporated by commercial producers into the media themselves."

Charles F. Hoban, 1960: "There is little evidence that film research findings have reached and influenced the producers or users of films for and in schools and colleges."

A. A. Lumsdaine, 1963: "Often the content and sequencing [of instructional films] are governed as much by practices and traditions borrowed from the field of theatrical motion pictures as by considerations of pedagogy."
Robert W. Wagner, 1966: In discussing educational films in the 1960's Wagner stated that "... more films were being made than ever before, but rarely were they the products of research. Rather, they were, for the most part, based on the same kind of intuitive judgments as before, reinforced by a new interest in the medium by subject matter specialists and by younger, fresher, and for the most part, more imaginative film makers."

Robert M. W. Travers, 1967: After interviewing four major producers of instructional films and viewing selected films, he concluded that "... in producing an instructional movie, decisions are made in terms of hunches and intuition rather than in terms of a set of well-defined production principles."

William H. Allen, 1971: Allen discussed the importance of the military film research programs (the Penn State-Army and Navy program and the Air Force program), but pointed out that none of the results have been incorporated into the instructional films produced by the military services or by the commercial producers.

1. What is your general reaction to these statements? Are they true? Accurate? Disturbing?

2. If you agree that it is true that the findings of film research do not find their way into film design, ...

   a. ... what do you think are some of the reasons for this situation?

   b. ... can you suggest any possible solutions for this situation?

If you are so inclined, please use the space below for any comments that you care to make concerning either the substance or the process of this project.

PLEASE RETURN QUESTIONNAIRE IN THE ENCLOSED ENVELOPE BY APRIL 14. DO NOT RETURN THE COMMENTS/OPINIONS LIST.
APPENDIX E

COMMENTS TO PART B BY PARTICIPANTS IN DELPHI I
APPENDIX E

COMMENTS TO PART B ITEMS BY PARTICIPANTS IN DELPHI I

Part B of Delphi Questionnaire I called for comments on other design elements that are often considered when designing instructional films. These were areas in which research was inconclusive. Listed below are the general headings for these design elements along with the comments of the participants.

A. Use of optical effects (fades, dissolves, etc.)

1. "Optical effects should be used with judicial thinking. Use when all effects lend relief . . . . and is necessary to bridge time and space."

2. "These are of no value in an instructional film, but are 'conventions' which have become out of date."

3. "Use as separations or 'paragraphing'. Plane-of-image effects such as wipes not preferred."

4. "Useful, when necessary, even essential. It is like punctuation in writing--neither too many commas nor too few; neither too many paragraphs, nor too few."

5. "Important for emphasis or visual punctuation."

6. "May be useful if used in the right way."

7. "I simply cannot generalize about such devices. They are specific structural elements in a film and should be used as needed."

8. "Can be useful in some situations."

9. "I have found that these are usually more important for the film maker's sense of aesthetics than to the audience."

10. "These can be useful (1) in helping the flow of ideas and (2) in providing 'punctuation'."
11. "Not terribly important in straight instruction, but adds aesthetics."

12. "Minimum importance."

13. "In the hands of a professional they can polish a film, but are usually not a necessity. For a novice film maker they can usurp his attention from matters which are more important."

14. "Not necessary, but they make the production job easier and the result smoother at nominal cost. It takes much greater craftsmanship to make a good film without the use of effects."

15. "O.K. when contributory to visual effect, but they are non-contributory to informational content, generally speaking."

B. Use of music.

1. "Use music in films dealing with affective domain."

2. "Only when it is called for by the emotional component of the message. Do not use throughout film without well-defined reason. Title background and credits music."

3. "Used effectively, it can enhance instructional films (see How to Splice by Michigan State). Usually not used effectively and adds nothing. An unnecessary expenditure of time can go into this by the novice—for nothing."

4. "Set mood and pace."

5. "Important."

6. "Useful for (1) setting level of sound by projectionist, (2) setting mood, and (3) providing emphasis, etc."

7. "I use music sparingly—usually not at all. My feeling about this is that it is usually more important for the film maker's sense of aesthetics than to the audience."

8. "Not necessary in the 'pure' instructional film."
9. "No generalities possible. Music properly used can help strengthen a film. Improperly used it is destructive."

10. "Often adds dimension of value."

11. "Use in introduction or for mood purposes."

12. "Essential, when the film is not 'how-to-do' instruction or an eye-witness to an operation, but music must be part of the total effect (video-audio) and not a decorative appendage. When in doubt--leave it out."

13. "Generally not useful."

14. "Music has some value in an instructional film as it can emphasize tempo, accent important points, set a mood for learning."

15. "Most of the time music is used because of habit. Should be used only in special cases . . . otherwise . . . no music!!"

C. Maximum length of an instructional film.

1. "Twenty minutes . . . sometimes 15 minutes . . . now days 10 minutes is a long time."

2. "As experience with film increases, the trend is to make shorter and shorter instructional films, but the maximum length is probably 25 minutes."

3. "Entirely dependent upon interest span and 'segmentability' of concepts."

4. "As short as possible. Not longer than the classroom period, minus 5 to 10 minutes at the start for introduction and as much at the end for discussion. This leaves 20 minutes."

5. "Depends upon grade level and subject. Recommend 10 minutes for elementary, 10-15 for intermediate, 20 for junior and senior high school, and 30 for college."
6. "No limit, if interesting."

7. "Ten to fifteen minutes."

8. "Depends on complexity of task or idea--10 minutes maximum."

9. "The shorter the better! I am for 20 minutes as a maximum length though I frequently wish I were skillful enough to make shorter films."

10. "Depends on film and subject."

11. "Fifteen minutes."

12. "Approximately 20 minutes."

13. "Fifteen minutes--often preferably shorter. A lot can be put in a film due to film's efficiency in construction."

14. "Just long enough to get the communication across--anywhere from 10 seconds to 90 minutes, but for most purposes 25 minutes is a good maximum."

15. "The optimum length is 3 to 20 minutes."

D. Need for photographic realism vs. use of line drawings or cartoons.

1. "Depends on specific objectives, content, and audience (may also relate to budget in case of cartoons)."

2. "Both are important: realism for authenticity and detail, graphics for simplification, abstraction, revealing the invisible, and generalization."

3. "Depends on subject. Each has a place. In instructional films a combination often works well."

4. "Depends on film and subject."

5. "I have never found any conflict between these. One learns eventually the right place and time for each technique."
6. "Both are useful depending on the concept to be taught."

7. "If reality is important, then use photographic realism."

8. "Depends on subject and emphasis."

9. "Not answerable. Depends on subject and artist."

10. "Realism preferred, except where 'invisible processes' are involved."

11. "Symbolism has a definite use in instructional films, but it should then relate to the 'real' world, i.e., animation of a machine followed by live photography."

12. "I believe in photographic realism . . . but with the abstract, line drawings and cartoons are necessary."

E. Need for frame of reference for size and time dimensions.

1. "Yes . . . as per the subject. If not used, one is left in limbo."

2. "Necessary when the learner has to learn discriminations."

3. "Essential whether a natural element for scale (e.g., a hand) or for superimposed measurements of some type."

4. "Useful in science films."

5. "A must in some contexts. Viewer must be fully oriented to eliminate confusion."

6. "Most important! The camera always lies."

7. "Especially needed for unfamiliar objects."

8. "Generally useful, often essential as in scientific, quantitative films."
F. Need for relating content to specific instructional objectives.

1. "Important."

2. "The more clarity on objectives, the more effective the film can be, but the instructional objectives should include the humanistic dimensions of the topic whenever relevant."

3. "This should be kept under constant attention—lest the film maker wander off in digressive content. Content should always be as simple as possible. A muddled film usually means the objectives were lost or unclear."

4. "Very important."

5. "Important."

6. "This seems to be important to the teachers—not so much to the audiences."

7. "Content must relate to objectives to obtain maximum learning motivation and comprehension."

8. "Absolutely kills most educational films."

9. "Definitely important."

10. "Essential, but not as a club over the head of the creative communicator, but as a beacon to lead him to the desired goal by the most direct route."

11. "The essence of instructional film."

12. "This has been a much neglected concern, and only lately have we seen the need for a clearer definition of instructional objectives before the film is produced."

13. "No, not necessary. Content is primary in realism films and technique is secondary . . . but objective need not be pointed up or out."
G. Specific content vs. general content in film.

1. "Specific content . . . generalities and vagueness is what develops weakness and incompetence."

2. "In my judgment, general content is practically worthless in an instructional film. The learner needs specific information."

3. "Dependent upon function, i.e., whether introductory for a topic or unit or whether serving specific sub-objectives."

4. "Film is concrete. Abstractions are not successfully treated by the motion picture."

5. "Generalizations can be drawn subtly at the end of a film."

6. "Depends on objectives, audience, and content."

7. "Depends upon application of instructional film—specific must be oriented at some point by instructor, readings, or other visual material."

8. "I don't know a hard and fast rule. It depends on what the film and its maker are trying to achieve."

H. Use of dramatic sequences.

1. "Why not? Much of life consists of dramatic scenes."

2. "Only when necessary for maximum effectiveness. Only when it contributes to instruction."

3. "Depends on objectives, audience, and content, but don't overdramatize that which is not inherently dramatic."

4. "Important when objectives include humanistic, psychological, or sociological purposes, and specific structured interaction is required. Carefully selected cinema verite sequences may be more effective, and this approach should be considered as an alternative to staged action."
5. "Usually a digression on the part of a novice—only done because he wants to 'make movies.' Usually a mistake for instructional films. Can be of value, but only on rare occasions."

6. "Can enhance . . . and in history it is very important."

7. "Vital, if subject lends itself to it."

8. "Whenever it can be done with skill. Better no dialog than stiff dialog. Same about costumes. For a beginner cinema verite will be easier than dramatic sequences."

9. "Yes, in areas where human interaction is essential in developing the concept. Otherwise, why?"

10. "Drama has a definite function in instructional films, but only when one is concerned with affective learning. It is of little value in purely cognitive learning."

11. "Yes, this should be done, but the sequences must be done well and with realism . . . or they will be phoney."

I. Showing of errors.

1. "This can be dangerous. A lot of times you do not show errors because the scene may linger and cause error to be re-produced."

2. "Once the 'correct' method has been clearly established (and practiced by the learner), it is effective to briefly allude to errors without allowing the errors to be learned."

3. "Generally not, unless troubleshooting is part of the objective, or choices for alternative actions are desirable."

4. "When pedagogically sound, why not? Maybe in safety or similar behavioral or guidance situations, but I would hesitate. Only a good comic can make errors seem human, but not a challenge for imitation."

5. "Can be useful, but it depends on the subject."
6. "Not recommended."

7. "Can be effective if used in a proper construction and balance with the proper way."

8. "Useful and important (1) if carefully prepared discussion follows, or (2) if the natural consequences of the error are shown and the better alternative is shown."

9. "Negative teaching in psychomotor and cognitive domains is questionable. In affective domain, it is perhaps useful and in some cases essential."

10. "Good if shown with correct ways or ideas."

11. "Never! The visual impact is too great and some, who are daydreaming, might think the error is the approved way of doing things."

J. Additional statements: List any other factors that you feel are important for the novice film maker to know in designing instructional films.

1. "Limit objectives for any one film."

2. "The aesthetic elements in film making depend more on intuition than rules."

3. "Simplify! Simplify!"

4. "Clarity of ideas should be a constant aim."

5. "The film maker must research his subject. He can not take another's word about a topic's content."

6. "The film maker must experiment with camera angles, pacing, editing sequences, narrative, art work, etc."

7. "The production schedule should include time for film testing on sample audiences with the opportunity for revision."
8. "Film concept and extent of subject must be limited to what the viewer can digest (utilize). Too often films cover too much material."

9. "Get background of visual perception."

10. "Understand what films 'move' people; what films are considered 'good' by teachers, students, and the general public. Study these films and try to find out what makes them 'good'."

11. "Study the research. Criticize it."

12. "Talk with experienced educational film makers."

13. "Talk with experienced educational (instructional) film users."

14. "Really and deeply understand the subject matter from the inside out. Get the feel of it."

15. "Put yourself in the place of the teacher and the student who will use the film. Find out how the subject will be relevant to the needs of the student--as they perceive them."

16. "Stress the visualization of key concepts. Don't use picture to illustrate the words. Rather, let the logic of the action shape the film."

17. "Keep it short. Keep it simple. The two go together--and are extremely hard to attain. It may sound easy, but keeping the extraneous matter from creeping in and obscuring the principal content is difficult... for the novice or the professional. It simply takes a lot of work--in outlining the film, writing the script, filming, and editing. Each step has to avoid sidetracks."

18. "Objectives should not be too complicated."

19. "Don't try to cover too much in one film."

20. "Verbalization and grade level should be carefully considered."

21. "Don't underestimate your audience."
22. "I think they have been covered pretty thoroughly in the foregoing parts of this questionnaire. However, the elements that are described are based on a vocabulary of film conventions that are rapidly changing. Today's film maker must take this into account. Examples are the time-saving editing style used in many TV commercials, the current camera techniques, avoidance of fades and dissolves, dissonant music, etc."

23. "Strive for quality, rather than just trying to 'get by'."

24. "All techniques used in a film should be those appropriate to the particular task at hand."

25. "By the way the film maker handles his material, he is often teaching more than he intended."

26. When making a film, the film maker must be interested in his material and convey that interest to his audience."

27. "Build to the curriculum."

28. "Use imagination."

29. "Develop at speed level of average class."

30. "Try out ideas in script or storyboard form and if possible in rough-cut form."

31. "The narrator should be talking to the individual—not lecturing."

32. "Develop some questioning techniques—verbally or visually."

33. "Don't underestimate the students. Don't talk down under any circumstances."

34. "The first advice for a new film maker is to learn the language of sound motion pictures. The illustrated lecture, the TV lecture, even the best TV program, each have a separate idiom. This idiom may appear identical but it is only superficially similar to that of the motion picture."
35. "If there are rules of thumb, then they should read something like this:

(a) If you can't see it, don't tell it.
(b) If a sound is in the scene, be sure to get it on your tape (in synch if possible). The same holds true for words: they can also be part of the background sound effects.
(c) Think in sequences, not in separate frames: they are like photographs with framed-in motion. When assembled they will look like a picture gallery, not like a movie.
(d) A film is not the best carrier of information; it is the best visual document or evidence of an event which, incidentally, may contain information value. The motion picture is 'a happening,' 'Ein Erlebniss'—to use the German phrase."

36. "When narration is added to the sight-and-sound record of an event, it must be the accompaniment not the lead instrument. When you say, 'violin sonata' you don't even mention the piano, yet it is self understood unless otherwise stated. The narration became only by default the carrier of the film message. Let's not perpetuate the error."

37. "Tell the young person to read and re-read the formula for basic communication and he will not go wrong. Keep in mind at all times: 'WHO says . . . WHAT to . . . WHOM and for WHAT PURPOSE.' This takes care of the audience, the content and the objectives. Or to paraphrase Cato of Utica, 'Rem tene, imaginse sequenter'. (Stick to the subject, the images will follow.)"

38. "Simplicity and succinctness."

39. "Clarity in picture and sound—both in technical quality and content."

40. "Avoid tangents, since they are even more distracting as visual tangents."

41. "Maintain orientation, e.g., generally conservative 'standard' editing styles, etc."

42. "Plan for viewer involvement, before, during, and after. The film should not be an intrusion into the teaching process."
43. "The theatrical convention (transitions, climax-building, suspense, etc.) have little or no value in instructional films."

44. "There should be provision for the learner to practice the skill, technique, etc., immediately after viewing the film."

45. "There is no need to plan the film for group use, because the learner may be receiving the film by himself."

46. "There should be provision for successful acquisition of the skill or knowledge to be demonstrated by the learner by a performance test."

47. "Content of the film should be in an environment which is familiar to the learner, i.e., the setting, clothes, hair styles, etc."

48. "Be correct. Everything about the content must be correct. One incorrect thing should destroy all the film. How can you believe?"

49. "Because the audience (audiences) are so experienced at 'looking' and 'listening' at TV and motion pictures, be they the chemical process known as film, or the electrical process we know as TV, they are all ready to receive or reject. The motion picture had better be the best!"

50. "Not everyone can make an instructional film. Today there is the thought, 'I can make a motion picture . . . it's easy!' This is not so. Making instructional films is a very hard thing to accomplish; that is, to produce one that is effective!"

51. "One of the big problems is to get the 'authory' and the teacher 'together'. If the teacher believes in the 'authory', the instructional film is used. If not . . . no."

52. "Instructional films should be short . . . broken up into segments or sequences, etc. . . . Then with discussion, questions, and answers. 'Show and Tell' . . . cut the frills!"
APPENDIX F

COMMENTS AND OPINIONS OF DELPHI II PARTICIPANTS
APPENDIX F

COMMENTS AND OPINIONS LIST

PART A

5. a. Disagreed. "Too general a statement. Sound should be used to convey what the image can not. Labels can be seen too."
   b. Disagreed. "Only if the verbal material is a written rather than verbal-only response and when the picture and word reinforce each other directly."
   c. Disagreed. "This is a generalization which seems to me excessively doctrinaire."

6. a. Agreed, but inserted "but not always" after "often."
   b. The word "often" was encircled or underlined several times.
   c. Disagreed. "Notice the large number of non-verbal films produced in the last few years."
   d. Disagreed. "Pictures alone can be highly useful."
   e. Disagreed. "An ambiguous picture is the proof of the communicator's failure."
   f. Disagreed. "Film is a medium heavily weighted toward the visual. If pictures are properly used they can sometimes (or often) be very effectively used without words. This is a dangerous generalization."

8. a. Agreed, but stated that: "We may not have come across how to handle time. The motion picture medium is a time medium, however."
   b. Disagreed. "Vision can be misleading for both spatial and temporal distinctions."
   c. Disagreed. "How about temporal distinctions like 6 P.M. and summer? A concept like summer is often best expressed visually."
Comments and Opinions, Part A (Continued)

Statement
Number

9. a. Agreed, but stated that: "We may not have come across how to handle space."
   b. Disagreed. "Stereo recordings have certainly given us new ideas of how the sense of hearing can be used for temporal distinctions."
   c. Disagreed. "Both can be misleading."

    b. Disagreed. "I think my negative reaction stems from a dislike of this statement as made in the active voice, plus I find the examples confusing. In a sense it seems legitimate as an idea but I guess I'm too stubborn to agree with it in this form."
    c. Disagreed. "I would use sound as well as picture if sound is available, but sound is not necessary for movement in time and space."
    d. Disagreed. "I am not sure that a well designed visual concept would be improved by sound."

11. a. Disagreed. "Neither research nor my work in the design and production of films allows for such a generalization."

12. a. Agreed "in very general terms."
    b. Disagreed. "Depends entirely on subject and photographer; ditto for the recordist regarding the reverse."
    c. Disagreed. "Words can have multiple meanings, whereas visual symbols, especially in color film, approach the 'real' more unambiguously."
    d. Disagreed. "Ambiguity is a function of clarity. Producers tend to work harder on visual clarity."
Comments and Opinions, Part A (Continued)

Statement
Number

e. Disagreed. "Neither research nor my work in the design and production of films allows for such a generalization. I have not found it to be the case in my own work with any consistency."
f. Disagreed. "Nobody in his right mind could agree with both this and number 6 [Pictures are often ambiguous without the use of words, i.e., the picture needs the word as often as the word needs the picture.]. But the question of ambiguity really rests with the film maker and can not be judged out of context."
g. No choice made. "All are open to ambiguity."

13a. a. Agreed. "My agreement hinges on the phrase 'otherwise well-made film,' plus the suspicion that such devices not well integrated with its subject often distract the viewer even though they intrigue the filmmaker."
b. Agreed. "I still agree with this. See Neu's study, Penn State Film Reports, which verify this."
c. "My agreement had to do with zooms which I believe have been overused and add little to films. In general, though, I disagree."
d. Disagreed. "These are effective when used appropriately."
e. Disagreed. "Zooms and music can be dispensed with. Extreme magnification and stop motion may be essential to show certain points. Relevant attention getting techniques are important to keep a film from becoming dull."
f. Agreed with example of music, but disagreed with examples of zooms, extreme magnification, and stop motion, and commented: "Any EFX, if unmotivated, may be distracting. Vandermeer has shown that 'attention gaining devices' (arrows or close-ups, for example) do improve communication. The 'attention gaining devices' is the issue. Zooms and stop-motion are different, for example."

15a. a. Agreed, but stated: "Possible except aesthetic reasons."
b. Disagreed. "Color can affect mood. It can be used for highlighting or emphasis."
Comments and Opinions, Part A (Continued)

Statement
Number

c. Disagreed. "I think that color will produce an increase in learning at the lower grade levels because of the small child's quicker recognition of color-true scenes; color helps in recognizing the message."

15b. a. Agreed, but inserted word "Bad" before the word "Color."
b. Disagreed. "The term 'some cases' is open to wide interpretation. When the color is normal to the situation, it should never be 'distracting.'"
c. Disagreed. "Of course it can, but only if the film-maker failed in his task."

15c. a. Agreed, with the addition of "with present testing devices."
b. Disagreed. "Color is definitely related to kinds of subject matter where the identification of color is essential, e.g., color of snakes, flowers, etc."
c. No choice made. "This question is fuzzy and I can't answer it. My intuitive response to your question is along the lines of 'What the hell is he talking about?' Why perhaps? What is a measurable outcome? Etc."

16a. a. Disagreed. "Simplified generally--yes, but not over-simplified. Richness and authenticity of language are also relevant values."
b. Disagreed. "That's an inane generality. Sound is best used to convey the intangible, the philosophic, the things which can't be seen but which may be quite complex."
c. Disagreed. "This is a dangerous generalization. The amount of simplification depends on the level of the audience."

16b. a. Agreed, but added "or explain them."
b. Disagreed. "When germane to the learning task, use them, and define them visually."
c. Disagreed. "Agreement would imply that the film could not be used to define (e.g., by correlating picture with terminology)."
d. Disagreed. "Vocabulary building and definition of terms are important instructional objectives."
Comments and Opinions, Part A (Continued)

Statement
Number

e. Disagreed. "Can and should be used--but explained as a form of incidental learning."

f. Disagreed. "Very often a commentary can introduce (effectively) and define new terms. It can, in fact, be used to teach terminology."

17a. a. Agreed, but added "also their vocabulary level."

17b. a. Agreed and stated that "narrators generally speak at about 140 words per minute, when there aren't long pauses."

b. Agreed in "general terms and with adult audiences and some subjects. See rate of development."

c. Agreed, but stated: "Can be much lower."

d. Disagreed. "160 WPM is close to the rate of most narrated films."

e. Disagreed. "Research at the University of Wisconsin shows that too slow a rate of delivery leads to a loss of attention. Note: I would not want a track to be 100% packed with narration. Plenty of 'air' is needed, but I see no reason to slow down rate over video, especially if narration is closely integrated to the action."

f. Disagreed. "A synthesis of visual and verbal stimuli occurs at every instant, and it need not slow down the rate for comprehension."

g. No choice made, but stated: "I have made more than 200 films and have yet to measure narration rates. I simply don't know how or care to work that way."

18. a. Disagreed. "Depends on who is doing what to whom."

19. a. Disagreed. "Only in exceptional cases."

b. Disagreed. "If you want slides, don't bother trying to make a movie. If motion is essential, slides or stills are a poor substitute."

20. a. Agreed, but stated: "This can be overdone, i.e., a sense of realism will require that actual complexities be used, but attention focused by control of design elements."

b. "Disagree, but not always. Live action vs. animation vs. reenactments, etc."
Comments and Opinions, Part A (Continued)

Statement
Number

21a. a. Agreed, but stated: "Being too slow is equally bad."
   b. Disagreed. "Can see again. Too, too, too much might overload, but a bit too much may stimulate to more study and/or second showing."

21b. a. Agreed, but added: "or looped."
   b. Disagreed. "A nicely timed pause--yes, or a turn of a phrase to re-direct attention to the new element--but no slow down in rate of development beyond a brief pause. The key to this is usually the visual reorientation, and a judgment about clarity takes the place of any formula statement."
   c. No choice made, but commented: "Not always."

22a. a. Agreed, but stated: "Anything 'may' increase the amount of learning."
   b. Disagreed. Inserted after the word "may" the phrase "but less often than not." "We are turned off very often by the didacticism of summaries. If it's done well the first time, it should have a lasting impression."

23. a. Agreed, but inserted "but rarely" after "can be improved."
   b. Agreed, but stated: "Within limits."
   c. Agreed for "films in cognitive domain," disagreed for "films emphasizing affective responses."
   d. Disagreed. Inserted after "can be" the phrase "and again cannot." "You've made this an absolute."
   e. "I don't disagree strongly--so I'll agree with reservation. But keep in mind that you can turn an audience off by such redundancy."
   f. No choice made, but stated: "Depends on film."
COMMENTS AND OPINIONS LIST

PART B

Statement Number

1. a. Disagreed. "Opticals are the punctuation of the motion picture and can pin point, emphasize, and highlight key points or vital information."
b. Disagreed. "Depends on the optical. A double exposure may convey information in a way that is unique. Some opticals are, of course, only punctuation and are less important."
c. Disagreed. "They are the 'paragraphs,' punctuation marks and accents of the film maker. Abuse of optical effects is undesirable but omission also weakens the message."
d. Disagreed. "Opticals are an effective device if used properly. They should be part of the design of the film— not just something buttered on."

1a. a. Disagreed. "Their use as punctuation has become outmoded. We are conditioned by learning to their meaning. Now people are learning to read films without conventional punctuation symbols."
b. Disagreed. "Most audiences do not perceive them."

1b. a. Agreed, but "the word 'easier' must be defined: it can shorten and smoothen the flow of action."
b. Disagreed. "Requires more expense and time in preparing opticals."
c. Disagreed. "Substitute the word viewer for producer."
d. Disagreed. "Does not make producer's job easier. Takes much additional work and thought if used properly."
e. Disagreed. "I don't think it affects the producer's job."
f. Disagreed. "No, not easier. Rather more costly and more time consuming in the printing stages and negative cutting."
h. Disagreed. "I can't imagine how the use of opticals would make a producer's job easier. They can certainly get an editor past a bumpy cut, but a producer--?"
i. No choice made. "I don't understand this one. EFX may cover up bad filming and thus make the poor work easier to
Comments and Opinions, Part B (Continued)

Statement
Number

hide. Good opticals, well planned, could mean more and harder work for the producer."

1c. a. Disagreed. "They usually punctuate or are used as a crutch."

2. a. Agreed, but changed word "set" to "help establish."
   c. No choice made. "I'm not sure it's the main contribution and I don't like the word 'set.' It's far more tentative than that."

3. a. "Agree, except, of course, when the film deals with the subject of music."
   b. "Generally agree, but exceptions are: (1) a film about music, (2) a film about a social situation in which music of the type used is part of the situation—or part of the cultural milieu, i.e., history, anthropology, dance, etc."
   c. Disagreed. "Can emphasize and highlight key points."
   d. Disagreed. "Information impacts can not be divorced from affective responses. They are inter-related."
   e. Disagreed. "Music is one more aspect of a total impression."

4. a. Agreed. "Also seems necessary from a practical viewpoint, i.e., audiences expect music and are inclined to think something is wrong if it is missing."
   b. Agreed. "But must be aesthetically used. Otherwise, natural sound would be better."
   c. Disagreed. "Basic use is to set projector levels, alert students that information is coming—both hardly aesthetic."
   d. Disagreed. "If a film is one that would benefit from it, yes. Many films are better served by other kinds of sound, such as sound effects, etc."
   e. Disagreed. "I agree in general for non-science films. Science and math need no music introduction unless the design or content demand it."
   f. Disagreed. "If the film does not use music elsewhere, then opening with it misleads the audience aesthetically."
   g. Disagreed. "It should be at the beginning to set the sound level."
Comments and Opinions, Part B (Continued)

Statement
Number

h. No choice made. "Sometimes yes, sometimes no. Depends on opening. Also serves for projectionist to set level of sound before voice comes booming in."

6. a. Agreed. "Although certain kinds of subjects require much more time for development and certain techniques (e.g., cinema verite) are slower in revealing things."
b. Disagreed. "There are exceptions, but I do agree with this under classroom one hour periods or less."
c. Disagreed. "I still feel 20-25 minutes is too long."

8. a. Agreed that "this is basically true, but attitudes and moods can frequently be considered and possibly included."
b. Disagreed. "General content places specific in perspective."
c. Disagreed. "Brief general content may be needed to place the specific in proper context."
d. Disagreed. "Depends on the goal of the film. Many films give too much specific information and 'drown' the viewer."
e. Disagreed. "May be important for background information or general learning."
f. Disagreed. "This statement is too vague. What is 'general content'?")
g. Disagreed. "Even visual impression can add to the affective domain."
h. Disagreed. "It depends on the message: specific information often belongs in a reference book; film does better with general, frame-setting messages. I consider this question unanswerable."
i. Disagreed. "I don't really understand your distinction between 'general content' and 'specific information."

j. No choice made. "I don't know what is meant by 'general content.'"

10. a. No choice made. "If by 'dramatic' you mean staged, fictional recreations of the past with actors in costume--then yes, but a dramatic structure is essential in any good film."
Comments and Opinions, Part B (Continued)

Statement
Number

11. a. Agreed, but "could be either. Drama can pinpoint some concepts or principles or ideas."
   b. Disagreed. "The social sciences are rich in cognitive concepts that can be demonstrated through dramatic situations. If the concept involves human behavior, dramatic treatment may be necessary to visualize it."
   c. Disagreed. "Drama can also promote learning of factual information by relating it to the learner."
   d. Disagreed. "Ideas and knowledge concepts can be dramatized."
   e. Disagreed. "Depends on subject. Many factual concepts can be effectively communicated in dramatic scenes."
   f. Disagreed. "No such distinction is justified. Dramatic form has an impact both on learning and feeling."
   g. Disagreed. "Reenactment can present cognitive content."
   h. Disagreed. "As a principle of my own philosophy of education, I don't think one can (or should) make clear a separation between the affective and cognitive domains."

12a. a. Disagreed. "If consequences shown, no preference for affective or cognitive."
   b. Disagreed. "Research indicates that one tends to learn the behavior shown, even though it is 'negative' and affective rather than cognitive."
   c. Disagreed. "This is probably the worst way to use negative examples."
   d. Disagreed. "I don't see the relevance of this variable to affect or cognition. It may or may not be suitable depending on a great many other things."

12b. a. Disagreed. "Research indicates that one tends to learn the behavior shown, even though it is 'negative' and affective rather than cognitive."
   b. Disagreed. "My instincts tell me never to illustrate the negative because the visual message is so strong and the film maker has no control over the time, place, and condition of screenings."
   c. Disagreed. "The film message is stronger than the following discussion. What do you want the student to remember?"
Comments and Opinions, Part B (Continued)

Statement
Number

12c. a. Agreed. "Also if the natural consequences could be shown shortly thereafter."
   b. Agreed "per Jaspen breech-block study."
   c. Disagreed. "Unnecessary if 12b is observed."
   d. Disagreed. "Research indicates that one tends to learn the behavior shown, even though it is 'negative' and affective rather than cognitive."
   e. Disagreed. "My instincts tell me never to illustrate the negative because the visual message is so strong and the film maker has no control over the time, place, and condition of screenings."

12d. a. Agreed, "if tense change: change 'has been' to 'is' or 'will be.'"
   b. Agreed, "but add 'or pointed out.'"
   c. Disagreed. "If the correct method is shown, and learned, why muddy the waters by showing the incorrect method?"
   d. Disagreed. "My instincts tell me never to illustrate the negative because the visual message is so strong and the film maker has no control over the time, place, and condition of the screenings."
   e. Disagreed. "If the learner knows the correct method, why show him the wrong way to do it?"

13a. a. Agreed, "if it is a bad film. In a good film, this should not produce error in effect."
   b. Disagreed. "Nonsense! Some one has been awfully naive about the relative importance of image and sound stimuli."
   c. Disagreed. "It is the job of the filmmaker to see that this doesn't happen."
   d. No choice made. "I can't really react to this one."
   e. No choice made. "Depends upon how it's handled. Hitler did a good job on minority groups with the 'Big Lie' approach."
   f. Disagreed. "The daydreaming student should be found by testing and should see the film again."
Comments and Opinions, Part B (Continued)

Statement
Number

13b. a. Disagreed. "Look how many students try to imitate comics! People see errors in real life—and learn them. Contrast of errors and correct ways help people to see the difference."
b. Disagreed. "Just because a 'comic' commits the error does not mean we will not emulate him."
c. Disagreed. "A before and after test approach can be very effective."
d. Disagreed. "Per Jaspen breech-block study."
e. Disagreed. "Only a good director can. . . . The comical ability of the actor is irrelevant."
f. Disagreed. "Overstated."
g. Disagreed with use of word "only." "See Candid Camera."
h. No choice made. "I can't really react to this one."

b. Agreed. "But could vary at different points in the same film, however."
c. Disagreed. "For the reasons cited repeatedly here and in much of the research in this field. There is no consistent superiority of one over the other."

15. a. Agreed. "Very important to be in tune with where the audience is in sophistication about film per se and about subject matter being dealt with."
b. Agreed. "But I hope I understand 'the language of sound motion pictures' in the same terms you define it."

b. Disagreed. "Oversimplification makes message seem contrived. It inhibits relating it to actual situations or applications."
c. Disagreed. "Depends very much on the topic, the awareness of the viewer. Some instruction should be indirect and require the audience to 'put it together' themselves."

17. a. Agreed. "Definitely."
b. Agreed. But inserted word "imaginary" before "audience's."
Comments and Opinions, Part B (Continued)

Statement
Number

19. a. Agreed. "In fact, there seems to be less and less use of the conventional narrator (i.e., the disembodied voice)."

20. a. Agreed, but "should be WHO teaches WHAT to WHOM and then HOW."
   b. Agreed, but "only if you add the questions of HOW, WHEN, WHERE, and WHY."
   c. Agreed, but "should insert 'with WHAT EFFECT' after WHAT PURPOSE."
   d. Disagreed. "This model is useful in analyzing what has already been produced, but for the producer, a better model is: sender -> encoder -> channel -> decoder -> receiver (plus feedback)."

21a. a. Agreed, "but mostly in interlock stage of rough cut. Many can not understand or project enough from a script or story board."
   b. Disagreed. "A script or a story board is not a film."
   c. Disagreed. "Too many uncontrolled variables."

21b. a. Agreed. "Better than story boards but much more expensive."
   b. Agreed, "with completed film."
   c. "Strongly agree."
   d. Disagreed. "The opportunities for revision are seldom realizable—too expensive, and I have yet to find a producer who does this (except in entertainment films)."
APPENDIX G

QUESTIONNAIRE SENT TO LARGE SCHOOL SYSTEM SUPERINTENDENTS
January 28, 1972

Dear Sir:

For a research project in which I am engaged, I am attempting to ascertain the current names and addresses of audiovisual or media directors in all U. S. elementary and secondary public school districts with over 25,000 students. I must use this very brief questionnaire to obtain this specific information as it is not available from any existing source.

I will be very grateful if you will supply the following information as it applies to your district. Please fill in the blank spaces and check yes or no for the questions.

__Yes  ___No  Do you have a District Audiovisual or Media Director (or similar position)?

(Name of District Audiovisual or Media Director, or similar position)

(Title of Above Named Person)

(His/Her Complete School Address)

(City)  (State)  (Zip)

__Yes  ___No  Among other responsibilities, does the above named person exercise general or direct supervision over a district-owned collection of 16mm instructional motion picture films?

Please return this letter to me in the stamped self-addressed envelope by February 14, 1972.

Sincerely,

William D. Schmidt
Associate Professor
of Instructional Media
APPENDIX H

QUESTIONNAIRES SENT TO AUDIOVISUAL DIRECTORS

OF LARGE SCHOOL SYSTEMS
March 3, 1972

Dear

The purpose of this letter is to solicit your assistance in supplying information for a research project investigating the subject of design of instructional films. This research, which is for my Ph.D. dissertation in curriculum and media at Ohio State University, is entitled Design Elements in Instructional Films: An Attempt to Derive Some Operational Generalizations from Three Sources of Data. The three sources of data are: (1) a synthesis of generalizations drawn from experimental research, (2) a survey of the opinion of instructional film producers (using the Delphi Technique), and (3) an analysis of twenty outstanding instructional films (as selected by audiovisual directors).

It is in regard to the third source of data that I would like to ask for your help. Your investment of a few minutes in completing the attached questionnaire will be sincerely appreciated. A stamped, self-addressed envelope is enclosed.

Sincerely,

William D. Schmidt
Associate Professor and Coordinator of Media
Production Services
QUESTIONNAIRE

This study involves the identification of design criteria that would be useful in the production of instructional films. As indicated in the cover letter, a portion of the research will consist of a detailed analysis of twenty outstanding films. To assist me in this phase of the study, please supply the information requested under A and B below.

A. In a previous questionnaire mailed to the superintendent of your district, it was indicated that you provide either general or direct supervision over a district-owned collection of 16mm motion picture films. Please indicate the approximate number of 16mm titles that are in the collection. __________

B. As a means of identifying some of the outstanding films being used in schools today, would you please list from five to eight 16mm film titles that you consider to be among the best instructional films that are used in your district or system. The definition of instructional films being used is as follows: Films that involve a high degree of pre-planning and directional intent aimed at attaining selected and specific goals of instruction and that are designed for school audiences (K through 12) as opposed to theatrical, entertainment, sponsored, or experimental films. There is no time limitation on the release date of the titles that you select—-they may be recent releases or films thirty years old. In selecting the film titles, please consider feedback received from teachers, your own evaluative judgment, and any other source of information. Please do not rely solely on frequency of booking as a criterion of selection. It is recognized that you may not be familiar with the instructional effectiveness of all films in your collection, but please try to identify a few that tend to stand out above the rest. Rank ordering is unnecessary.

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PLEASE RETURN THIS QUESTIONNAIRE IN THE STAMPED, SELF-ADDRESSED ENVELOPE BY MARCH 24.
Dear

The purpose of this letter is to solicit your assistance in supplying information for a research project investigating the subject of design of instructional films. This research, which is for my Ph.D. dissertation in curriculum and media at Ohio State University, is entitled Design Elements in Instructional Films: An Attempt to Derive Some Operational Generalizations from Three Sources of Data. The three sources of data are: (1) a synthesis of generalizations drawn from experimental research, (2) a survey of the opinion of instructional film producers (using the Delphi Technique), and (3) an analysis of twenty outstanding instructional films (as selected by audiovisual directors).

It is in regard to the third source of data that I would like to ask for your help. Your investment of a few minutes in completing the attached questionnaire will be sincerely appreciated. A stamped, self-addressed envelope is enclosed.

Sincerely,

William D. Schmidt
Associate Professor and
Coordinator of Media
Production Services
QUESTIONNAIRE

This study involves the identification of design criteria that would be useful in the production of instructional films. As indicated in the cover letter, a portion of the research will consist of a detailed analysis of twenty outstanding films. To assist me in this phase of the study, please supply the information requested below.

A. Are you the district-wide Audiovisual or Media Director (or similar position)?  ____ Yes  ____ No

B. Do you have a district-owned collection of 16mm motion picture films?  ____ Yes  ____ No

If yes, approximately how many 16mm titles are in the collection? ____________

C. If you have a district-owned collection of 16mm motion pictures, do you exercise either general or direct supervision over the collection?  ____ Yes  ____ No

If you answered either B or C with a "no," you need not complete Section D.

D. As a means of identifying some of the outstanding films being used in schools today, would you please list from five to eight 16mm film titles that you consider to be among the best instructional films that are used in your district or system. The definition of instructional films being used is as follows: Films that involve a high degree of pre-planning and directional intent aimed at attaining selected and specific goals of instruction and that are designed for school audiences (K through 12) as opposed to theatrical, entertainment, sponsored, or experimental films. There is no time limitation on the release date of the titles that you select—they may be recent releases or films thirty years old. In selecting the film titles, please consider feedback received from teachers, your own evaluative judgment, and any other source of information. Please do not rely solely on frequency of booking as a criterion of selection. It is recognized that you may not be familiar with the instructional effectiveness of all films in your collection, but please try to identify a few that tend to stand out above the rest. Rank ordering is unnecessary.
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PLEASE RETURN THIS QUESTIONNAIRE IN THE STAMPED, SELF-ADDRESSED ENVELOPE BY MARCH 24.
APPENDIX I

DESCRIPTION OF THE TWENTY SAMPLE FILMS
APPENDIX I

DESCRIPTION OF THE TWENTY SAMPLE FILMS

Nanook of the North (54 minutes, sound, black and white, 1946). Designed for general audiences. The film remains one of the great classics of the documentary film. Music, sound effects, and narration have been added to the original which was produced as a silent film in 1922 by Robert Flaherty. It depicts the heroic and noble struggle of Nanook, an Arctic hunter, pitted against the harsh elements of the far north. Flaherty spent five years with Nanook and his family in making the film. Produced and directed by Robert Flaherty and distributed by McGraw-Hill/Contemporary Films.

Nature's Half Acre (32½ minutes, sound, color, 1953). Designed for general audiences as a theatrical short subject. The film shows all of the millions of inhabitants of the tiny grass-roots world in any half acre and how the balance of nature is maintained. Fifteen naturalist-photographers contributed footage of some of the rare sights of nature. Produced by Walt Disney Productions and distributed by Walt Disney Educational Materials Company.

The Loon's Necklace (11 minutes, sound, color, 1948). Designed for grades six through twelve for use in language arts, reading, and art. An Indian legend of how the loon received his distinguishing neckband. Authentic ceremonial masks, carved by Indians of British Columbia, portray the Indians' sensitivity to the moods of nature. Produced by Crawley Films Limited and distributed by Encyclopaedia Britannica Educational Corporation.

Hemo the Magnificent (55 minutes, sound, color, 1957). Designed for general audiences as a television program for the Bell Telephone Hour. The film is about blood and the circulatory system. Produced by Frank Capra, based on screenplays devised by a scientific panel of experts, and distributed by the American Telephone and Telegraph Company.
Our Mr. Sun (56 minutes, sound, color, 1956). Designed for general audiences as a television program for the Bell Telephone Hour. The film is about the sun and its many effects upon all life on earth. Produced by Frank Capra, based on screenplays developed by a scientific panel of experts, and distributed by the American Telephone and Telegraph Company.

Beaver Valley (31½ minutes, sound, color, 1953). Designed for general audiences as a theatrical short subject. The film shows wildlife in one valley of the wilderness of the Continental Divide--with an accent on the beaver and his activities. Produced by Walt Disney Productions and distributed by Walt Disney Educational Materials Company.

Donald in Mathmagic Land (26 minutes, sound, and color, 1959). Designed for general audiences as a theatrical short subject. The film attempts to develop in its audience a new appreciation of the value and importance of mathematics in their daily lives. Principles of mathematics are related to music, art, architecture, mechanics, and sports. Produced by Walt Disney Productions and distributed by the Walt Disney Educational Materials Company.

An Occurrence at Owl Creek Bridge (27½ minutes, sound, black and white, 1962). Designed for general audiences. The film is adapted from the short story of the same name by Ambrose Bierce. Its subject is a hanging during the American Civil War. Produced by Marcel Ichac and Paul de Roubaix and directed by Robert Enrico, it is distributed by McGraw-Hill/Contemporary Films.

Paddle to the Sea (28 minutes, sound, color, 1966). Designed for general audiences. The film, a children's odyssey, is about the journey of a hand-carved toy canoeman from Canada's northern forest downstream to the distant sea. The film is based on the story of the same name by Holling C. Holling. Produced by the National Film Board of Canada, it is distributed by McGraw-Hill/Contemporary Films.
Leo Beuerman (13 minutes, sound, color, 1969). Designed for use by general audiences. The film deals with a day in the life of a handicapped person who is both independent and enterprising. Overcoming adversity, he developed a useful and meaningful life. Produced and distributed by Centron Educational Films.

Pigs! (11 minutes, sound, color, 1967). Designed for the primary school for use in language arts and creative activity. This film deals with the sights and sounds of pigs. Narrationless, it is designed to provoke thought, discussion, and writing. Produced by Dimension Films and distributed by Churchill Films.

Rainshower (14½ minutes, sound, color, 1965). Designed for the primary school for use in language arts and creative activity. The film deals with the sights and sounds, the beauty and rhythm of rain. It attempts to capture the changing moods of a day when a rainshower came to plants and animals on a farm and to people at work in a city. The only narration—44 seconds—comes at the beginning. It was designed to provide practice in careful observation. Produced by Dimension Films and distributed by Churchill Films.

Red Balloon (33½ minutes, sound, color, 1957). Designed for general audiences. The film is a fantasy of the world of childhood in which a young boy makes friends with a balloon, "tames" it and begins to relate to it as if it were a human playmate. The boy and the balloon play together on the streets of Paris until a gang of children try to destroy the balloon. Finally they succeed, but then all of the balloons in Paris come to the boy and carry him away into the sky. A French film produced, written, and directed by Albert Lamorisse, it is distributed by CCM Films, Inc.

Black and White Uptight (35 minutes, sound, color, 1969). Designed for junior and senior high school and college social studies. This film explores the myths that perpetuate prejudice against black people in our society and shows the subtle ways that hate is learned. Examples are given of areas in which government, business, and black and white people are working together to wipe out hatred and misunderstanding between the races. Produced by Avanti Films and distributed by Bailey-Film Associates.
Hailstones and Halibut Bones  (Part 1: 6 minutes, sound, color, 1964), (Part 2: 7 minutes, sound, color, 1967). Designed for use in kindergarten through grade three language arts and creative expression. From the poem of the same name by Mary O'Neil, these two films describe the colors that fill the world and make them vividly visual. Produced and distributed by Sterling Educational Films.

Drugs and the Nervous System  (18 minutes, sound, color, revised 1971). Designed for junior and senior high school health and science classes. The main theme of the film is that drugs can bring pain and despair; they can also bring health. It points out how drugs affect many different parts of the body by working indirectly on the nervous system. Produced and distributed by Churchill Films.

Is It Always Right to be Right?  (8 minutes, sound, color, 1970). Designed for junior and senior high and college language arts and social studies. "There once was a land where men were always right." This is the way this parable as told by Orson Wells begins. It then highlights the centers of divisiveness in our society— the generation gap, war, poverty, race. It ends on a note of challenge and hope. Produced by Stephen Bosustov Productions and distributed by King Screen Productions.

The Lottery  (18 minutes, sound, color, 1969). Designed for junior and senior high school humanities. This is a film adaptation of the Shirley Jackson novel about an annual lottery in a small middle-class community. The matter-of-fact way in which the ceremony proceeds accentuates its brutality and senselessness in our time. Designed to provoke discussion by students, it has a follow-up film entitled "A Discussion of Shirley Jackson's The Lottery." This film presents one expert's interpretation of the film The Lottery. Produced and distributed by Encyclopaedia Britannica Educational Corporation.

Why Man Creates  (25 minutes, sound, color, 1968). Designed for the general public. The film is composed of eight separate and distinct episodes, each of which explore some facet of man's drive to be creative. Produced by Saul Bass for the Kaiser Aluminum and Chemical Corporation and distributed by Pyramid Films.
The Face of Lincoln (22 minutes, sound, black and white, 1955).

Designed for general audiences. Professor Merrell Gage, retired head of the Department of Sculpture at the University of Southern California, describes the life and career of Abraham Lincoln as he sculptures in clay a life-like bust of the sixteenth president, making physical changes in the subject's features to correspond to events in Lincoln's life. Produced and distributed by the University of Southern California.
APPENDIX J

INSTRUCTIONAL FILM ANALYZATION GUIDE, PART 1
(For Individual Examination)

Film Title:__________________________________________ Intended Audience:__________________________
Curricular Areas:____________________________________ Film Length:______________________________

Section A:

Primary Operational Generalization

1. Since viewers perceive and respond selectively to motion pictures, instructional films should be prepared with a specific audience in mind, i.e., the film should accommodate the wants, feelings, interests, experiences, and perceptual tendencies of a well-defined viewer group.

2. Audience participation and/or practice (either overt or covert) during a film presentation can improve learning if it is appropriate to the learning task and if it does not constitute an interference with the film's message.

Analysis Method

1. Examine the film and its study guide and/or contact the producer to determine if the film was planned for a specific audience. If so, specify the audience. If necessary to contact the producer, use the questionnaire in Section D of this guide.

2. Participation techniques are ones which consciously engage and involve the viewer. Examine the film to find examples of participation techniques such as the following:

   a. Inserting questions within the film.
   b. Instructing the audience to call out or write names of items (like phonetic names of map signs or of Russian words).
Primary Operational Generalization

3. During a film presentation involving student participation, learning can be improved if a student is supplied with a knowledge of results about his performance.

Analyzation Method

c. After completing a unit of film, a title may direct students to answer an appropriate question on a worksheet. Shortly after, the correct answer may be given on the screen.

d. Asking a viewer to perform some operation (like learning to tie knots) while it is being demonstrated and explained in the film).

e. Interspersing the showing of film segments with practice sessions.

f. Mentally practicing during a film showing (e.g., asking students to mentally practice steps of a task) or to think about the correct response to a question without actually saying it aloud or doing it.

List any specific examples found.

3. By knowledge of results, it is meant that answers posed in a film are answered by either oral, printed, or pictorial means.

Search the film for examples of uses of this type. List any examples found.
Primary Operational Generalization

4. The subjective camera view should be used in training subjects to perform a perceptual motor task, i.e., show a performance or demonstration on the screen the way the learner would see it rather than from the view of a bystander.

5. A pictorial stimulus and a verbal response or label appears to be the most effective arrangement of pictorial and verbal material.

Analysis Method

4. Examine the film for evidence of the use of the camera from the subjective viewpoint to teach perceptual motor tasks.

5. Words label or categorize or come to stand for a pictorial object or event. According to Fleming, this is consistent with our "... perceptual encounter with the world. We meet people and learn their names; we observe moisture forming on windows and hear the term condensation; we notice on a map a rectangular area with a diagonal southern border and see the name Indiana." Travers observed also that learning is facilitated by having a picture of an object at the stimulus end of the task rather than the printed name of the object.  

Examine the film to ascertain if the use of a pictorial stimulus and a verbal response or label is the predominant arrangement.

---


3 Travers, Audiovisual Information Transmission, p. 36
Primary Operational Generalization

6. Pictures are often ambiguous without the use of words, i.e., the picture needs the word as often as the word needs the picture.

7. The visual and audio elements have a greater combined effect than either one alone, provided the two elements are relevant to each other.

8. Vision is a sense that is best for spatial distinctions (e.g., mountain, mile, cube, and leaf shape), but relatively poor for temporal distinctions.

9. Audition (the sense of hearing) is best for temporal distinctions (e.g., rhythm, sequence, frequency, music, or speech), but relatively poor for spatial distinctions.

10. If a concept involves both time and space (e.g., plant growth, life cycles, erosion, city, and the westward movement), use both vision and audition.

Analyzation Method

6. View the film and determine whether words generally accompany the pictures.

7. View the film to determine the relative use of visual and audio combined as compared to visual or audio alone.

8. Examine the film to see if vision was used primarily for spatial distinctions rather than for time distinctions.

9. Examine the film to see if audition is used predominantly for temporal distinctions as opposed to spatial distinctions.

10. Fleming has pointed out that with concepts of this nature, audition "... would probably take the form of naming, describing, or calling attention to the spatial changes perceived visually."4

Primary Operational Generalization

11. Color in instructional films has not been demonstrated to produce any general over-all increased learning in comparison with black-and-white films, except when the learning involved a color discrimination.

12. Film commentaries should be simplified as much as possible.

Analysis Method

Examine the film to see if both vision and audition are generally used for concepts involving both time and space.

11. Examine the film to determine if (1) the film is in color and (2) if in color, is a color discrimination involved?

12. Use the Dale-Chall readability formula to determine if the film's commentary is simplified sufficiently for the intended audience. The Dale-Chall formula was designed for measuring readability of printed materials. It calls for four 100-word samples for each 2,000 words. These are to be spaced evenly. It was found that by taking four samples for each eleven-minute film, this would be fairly comparable to the Dale-Chall requirement for printed materials.

Take four 100-word samples of commentary for each eleven minutes of film. If the film exceeds eleven minutes, take one additional sample for each two and three-fourths minutes. Always take one sample at the beginning of the film and one at the end. Also, take a sample across any definite sequence changes. Complete
instructions on administering and computing the Dale-Chall formula can be found in the *Educational Research Bulletin* of February 18, 1948.\(^5\) A work sheet for computing the Dale-Chall readability formula can be found in Section C of this guide.

13. The commentary should avoid the use of unfamiliar names or technical terms.

14. The Dale-Chall samples will also be used in measuring the number of words per minute. A Siemens interlock projector can be used. This projector runs at a precise twenty-four frames per second and has a frame counter synchronized with the motor. The following procedure will produce the word per minute rate for each sample.

\[ \text{Divide the number of frames of the sample by 24.} \]
\[ \text{This will yield the number of seconds contained in the sample. Next divide the number of words in the sample by the number of seconds. Then multiply by 60 to get the word per minute rate.} \]
\[ \text{These figures should be entered on the work sheet found in Section C of this guide.} \]

---

Primary Operational Generalization

15. In the narration of an instructional film, the active form of sentence structure is preferable to the passive form.

Analyzation Method

15. A verb is in the active voice when its subject performs the action. A verb is in the passive voice when its subject receives the action and the verb is transitive. The passive voice is always made up of the past participle of a verb (e.g., set, hurried, drawn, created) with a form of the verb be. Common forms of the verb be follow: am, is, are, was, were, been, and be.

To identify passive voice constructions, scan the narration of each film and underline any use of the verb be along with a past participle (e.g., is set, was hurried, is drawn, have been created). Then apply the following two tests:

1. Does the subject do the acting? (If not, this indicates the passive voice.)
2. Is the subject receiving the action? (If yes, this indicates the passive voice.)

For every form of the verb be used with a past participle for which the above two tests indicate passive voice, count the construction as passive.

In order to determine the incidence of passive sentences compared to the total number of sentences and compared to the potentially passive sentences, it was necessary to
16. In instructional film, still pictures may sometimes replace the use of moving pictures and be equally as effective and less expensive.

16. For the purposes of this examination, still pictures are defined as static, non-motion representations that, had they been recorded by a motion picture camera in the normal manner, they would
17. The rate of development should be even slower at points at which it is necessary for the viewer to change attention from one source to another. (To be meaningful to the examiner, he should first read Primary Operational Generalization 7 of Part 2 of this guide.)

18. Introductory and summary material in a film may increase the amount of learning.

17. Source refers to the source of information, e.g., alternation of attention from one part of a visual to another, from one sequence of a film to another, or from a predominantly visual message to a predominantly audio message.

Select examples of alternation of attention and determine if there is a marked reduction in the rate of development at those points. Accomplish this by (1) counting of the words per minute and (2) the sampling of the visual material of the film and ascertaining scene length. These counts will be compared with samples in other parts of the film.

18. Miller defined an introduction as "... a statement about the content of a film. It may be an over-all description of what is to follow; it may state the points to be covered in the film; it may simply relate the major objective of the film."
Primary Operational Generalization

Analyzation Method

Sometimes an introduction comes after the opening scene of the film. Miller further defines a summary: "A summary of the information is called a review. There are two kinds of review. Spaced review usually follows each unit of information as it is presented (not to be confused with redundancy); massed review usually occurs at the end of the film. Either type can review the points through pictures, words, or both. It may be a simple statement, or it may be more complex, but it must relate to what has been taught within the body of the film."  

Through an examination of the film's images and its scripts or transcriptions, use these definitions to determine if the film contains introductions or summaries.

19. The effectiveness of a film can be improved by organizing it so that important sequences or concepts are repeated by depicting the same idea in several ways.

19. Examine the film for visual repetition and the film's script or transcription of the sound track for audio or verbal repetition.

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6 Miller, "16mm Instructional Film Research," p. 115.

7 Ibid., p. 116.
Section B:

Secondary Operational Generalization

1. Optical effects (fades, dissolves) contribute little to the information content of an instructional film...

   a. . . . but they can serve as a form of punctuation...

2. While the optimum length of a film depends on the subject and the audience, an instructional film should seldom exceed 20 to 25 minutes.

3. Whenever dealing with objects unfamiliar to the intended audience, some frame of reference is needed for size and time dimensions.

Analysis Method

1. Conduct and tally a visual count of fades and dissolves. (Also see Secondary Operational Generalization 2 in Section B of Part 2 of this guide.)

   a. By punctuation, it is meant that optical effects have come to mean a passage of time or a change of locale. In writing, punctuation reveals that one paragraph or chapter is completed and a new one will follow. With fades and dissolves a similar transitional effect appears to be possible.

   Examine the film to find evidence of uses of these types of punctuation.

2. Compute the length of the film. (Also see Secondary Operational Generalization 10 in Section B of Part 2 of this guide.)

3. Relating unfamiliar objects with familiar objects can be done both visually (e.g., showing an insect next to a ruler) and verbally (e.g., stating that the size of the insect is similar to your thumb nail.)
Secondary Operational Generalization

4. It is essential that content in instructional films be related to specific instructional objectives.

5. The use of negative examples through the showing of errors in instructional films can be effective in the following situations:
   a. If the subject matter deals with the affective domain.
   b. If the natural consequences of the error are shown along with a better alternative.
   c. If the correct method is or will be clearly established and practiced by the learner.

Analyzation Method

4. Examine study guides and view the film and/or contact the producers. If necessary to contact the producer, use the questionnaire in Section D of this guide.

5.

   a. View the film and list examples of use of negative examples with subject matter dealing with the affective domain.
   b. View the film and list examples of use of negative examples where the natural consequences of an error were or were not shown.
   c. View the film and list examples where the correct method was and was not shown.
### Secondary Operational Generalization

6. Instructional films should be field tested...
   
   a. ... by trying out ideas in script or storyboard form and if possible in rough cut form...
   
   b. ... by using sample audiences with opportunity for revision.

### Analyzation Method

6.

a. Use the questionnaire in Section D to find out from the producer if they used these types of field testing.

b. Use the questionnaire in Section D to find out from the producer if they used this type of field testing.
**Section C:**

*Work Sheet for Dale-Chall Readability Formula, Words per Minute, and Scene Lengths*

<table>
<thead>
<tr>
<th>Film Title</th>
<th>Sample 1</th>
<th>Sample 2</th>
<th>Sample 3</th>
<th>Sample 4</th>
<th>Sample 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distributor</td>
<td>From To</td>
<td>From To</td>
<td>From To</td>
<td>From To</td>
<td>From To</td>
</tr>
</tbody>
</table>

**Dale-Chall Formula Computation:**

1. Number of words in the sample ........................................
2. Number of sentences in the sample ...................................
3. Number of words not on Dale list ......................................
4. Average sentence length (divide 1 by 2) .............................
5. Dale score (divide 3 by 1, multiply by 100) ..........................
6. Multiply average sentence length (4) by .0496 ......................
7. Multiply Dale score (5) by .1579 ......................................
8. Constant ...........................................................................
9. Formula raw score (add 6, 7, & 8) ....................................
   Average raw score of ____ samples .....................................
   Average corrected grade-level .........................................

**Other Computations:**

- Words per minute in each sample ........................................
- Number of scenes in the sample .........................................
- Average scene length in each sample (in seconds) ..................

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SECTION D

QUESTIONNAIRE TO PRODUCERS OF SAMPLE FILMS
Dear

The purpose of this letter is to solicit your assistance in supplying information for a research project investigating the subject of design of instructional films. This research, which is for my Ph.D. dissertation in curriculum and media at Ohio State University, is entitled Design Elements in Instructional Films: An Attempt to Derive Some Operational Generalizations from Three Sources of Data. The three sources of data are: (1) a synthesis of generalizations drawn from experimental research, (2) a survey of the opinion of instructional film producers, and (3) an analysis of twenty outstanding instructional films.

It is in regard to the third source of data that I would like to ask for your help. The twenty outstanding instructional films were selected through a polling of over one hundred audiovisual directors. For each title produced or distributed by your company which was among the top twenty, a separate questionnaire is enclosed. Your investment of a few minutes in completing these questionnaires will be appreciated. A stamped, self-addressed envelope is enclosed.

Sincerely,

William D. Schmidt
Associate Professor and
Coordinator of Media
Production Services
QUESTIONNAIRE

Directions: In order to assist me in performing a detailed analysis of the below listed film, I need some specific information. Please supply the requested information for only those items checked in red. Since it is a matter of record that this film is held in high regard by a substantial number of school people, a negative response to any of the items will in no way detract from this film's wide-spread acceptance. My main concern is to ascertain the present state-of-the-art of instructional film design.

Film Title: ___________________________________________________________

___ 1. Was this film originally prepared for use by school audiences (anywhere from kindergarten through grade 12)? Yes___ No____. If yes, please specify the audience: Grade level____________; Curriculum Area______________________________________________________;
   If no, please specify the type of audience the producers had in mind:____________________________________________________________

___ 2. Were selected and specific instructional objectives in existence to guide the production of this film? Yes___ No____. If yes, please list the objectives:____________________________________________________________

___ 3. Was this film field tested in any of the following ways:
   a. By trying out ideas in script or storyboard form? Yes__No_. If yes, please describe the circumstances under which it was tried out or field tested:_________________________________________________________________
   b. By trying out film in rough cut form? Yes__No_. If yes, please describe the circumstances under which it was tried out or field tested:_________________________________________________________________
   c. By trying out film with sample audiences with an opportunity for revision? Yes__No_. If yes, please describe the circumstances under which it was tried out or field tested:_________________________________________________________________

PLEASE RETURN THIS QUESTIONNAIRE IN THE STAMPED, SELF-ADRESSED ENVELOPE BY AUGUST 25, 1972, TO:

WILLIAM D. SCHMIDT, AUDIOVISUAL SERVICES, CENTRAL WASHINGTON STATE COLLEGE, ELLENSBURG, WASHINGTON 98926
INSTRUCTIONAL FILM ANALYZATION GUIDE, PART 2
(For Panel Examination)

Film Title: _____________________________

Directions: Read the complete list of operational generalizations along with the accompanying analysis sections. View a film and reread each operational generalization, the analysis sections, and then respond to the questions. Please make any additional comments for any of the questions which would be helpful in explaining why you responded in the way that you did.

Intended Audience: _____________________________
Curricular Areas: _____________________________
Film: _____________________________
Length: _____________________________

Section A:

Primary Operational Generalization

1. Color can in some cases prove to be a distracting influence.

Analysis

1. Question: Did you notice any instances in which color was a distracting influence? Yes____ No____ If yes, please list the specific examples.
2. There is some evidence that color should be used in media design, but the nature of its precise effect can, perhaps, not be assessed in terms of measurable outcomes of learning.

3. Film commentaries should be simplified as much as possible.

4. The commentary should avoid the use of unfamiliar names or technical terms.

5. Film narration should be designed so as to not have either too little or too much talk. In determining the right amount of talk, complexity of the material and the intellectual level of the audience must be taken into account.

Analysis

2. Question: If the film was produced in color, do you think black-and-white would have been equally as effective in terms of potential measurable learning gains? Yes___ No____. Give a specific reason for your answer.

3. Question: In this film did you feel there were any instances in which the commentary was not simplified as much as possible? Yes___ No____. If yes, please list the specific examples.

4. Question: Did you notice any instances in which names or technical terms were used which might be unfamiliar to the intended audience? Yes___ No____. If yes, please list the specific examples.

5. Question: Considering the complexity of the material and the intellectual level of the intended audience, did you find any situations in which the narration contained . . . (a) . . . too little talk? Yes____ No____. (b) . . . too much talk? Yes____ No____.
Primary Operational Generalization

**Analysis**

If yes, please list the specific situations.

6. The visual image should be simplified as much as possible. Only the most relevant and necessary attributes should be included in the image. All irrelevant attributes should be excluded.

7. Because man is a selective perceiver and is limited in the amount of information he can process, the rate of development of a film should be slow enough to permit him to grasp the material as it is shown.

---

8. The main function of introductions is to alert the audience as to what to expect and to thereby direct attention to relevant features. Summaries serve to restate and re-emphasize the main points.

9. Attention-directing devices (e.g., animation techniques, color, close-ups, slow or fast motion, unusual sounds, and the use of selected camera angles) may aid learning by calling attention to relevant parts of a visual which may otherwise be overlooked.

Analysis

8. Question: If an introduction and summary were used, do you feel that the following statements describe their function--
(a) "The main function of introductions is to alert the audience as to what to expect and to thereby direct attention to relevant features." Yes____ No____
(b) "Summaries serve to restate and re-emphasize the main points." Yes____ No____

9. Note: a distinction can be made between devices used in films to direct attention of the audience as opposed to those which aim to gain attention. Attention-directing devices are used to direct attention to a portion of a visual (so that information will not be missed). Attention-gaining devices are used to attract attention to a film or to scenes or sequences of a film. The same effects (e.g., slow motion) can be used for either attention-directing or gaining. One film might use slow motion in the first scenes of the film to gain the audience's attention. In another film, slow motion may be used (along with pop-in arrows) to direct the attention to something happening within the visual.
10. Attention-gaining devices (such as zooms, music, extreme magnification, and stop motion) which call attention to irrelevant materials may interfere with learning of more important items.

10. Such devices may be attention-gaining in their own right, but unrelated to the pictures or narration. Some examples might include (1) a picture of a pretty girl, (2) an athlete in frozen motion, (3) the use of unusual sounds such as train whistles, pistol shots, etc., and (4) sound tones to accompany processes such as the listing of five steps in order.

Question: Did you observe any examples of where attention-gaining devices were used which called attention to irrelevant materials?
Primary Operational Generalization

Section B:

Secondary Operational Generalization

1. While man's attention is known to be drawn to that which is novel and complex, attention-gaining devices as used in instructional films apparently add little to an otherwise well-made film. (See examples cited in A-10 above.)

Analysis

which thereby interfered with the learning of more important items? Yes No
If yes, please list the specific examples.

Analysis

1. In addition to the examples cited previously, look for the following: spotlighting, a fast pan as the first scene of a film, unusual camera angles, alternating commentators' voices, the giving of direction such as "Now see this!," slow emphatic reading of commentary, and supplying sound effects such as machine shop noises.

Question: Did you observe any examples of where attention-gaining devices were used? Yes No
Secondary Operational Generalization

2. Optical effects (fades, dissolves) contribute little to the informational content of an instructional film . . .

a. . . . but they can make an aesthetic contribution to a film.

3. In instructional films dealing with content which involves the affective domain (learning dealing with feeling states associated with attitudes, values, and appreciations), the main contribution of music is to help establish the mood and pace.

Analysis

2. Question: Did you observe any specific examples in which you felt that optical effects (fades, dissolves) contributed to the informational content of a film? Yes__ No__
   If yes, please list the specific examples.

a. Question: As used in the film viewed, do you agree that in some cases the optical effects (fades, dissolves) made an aesthetic contribution to the total production? Yes__ No__
   If yes, please list specific examples.

3. Question (for films involving affective domain):
   Do you agree that the main contribution of music, as used in this film, was to help establish . . . (a) The mood? Yes__ No__
   (b) . . . The pace? Yes__ No__
Secondary Operational Generalization

4. Other than the contribution cited in the previous statement, music generally adds little to the informational content of an instructional film, except, of course, when the film deals with the subject of music.

5. The use of title and introductory music is probably justifiable from an aesthetic standpoint.

6. Dramatic sequences in instructional films should only be used when the subject clearly calls for it and then only when it can be done skillfully. Dramatic sequences are here defined as portions of a film in which the story or content is acted out by actors.

7. The strength of an instructional film should be primarily in the visual elements and secondarily in the narration and other audio elements.

Analysis

4. Question: With the exception of when a film deals with the subject of music, would you agree that music generally added little to the informational content of the film viewed? Yes___ No___

5. Question: Do you agree that title and introductory music was justifiable from an aesthetic standpoint? Yes___ No___

6. Questions: (for films containing dramatic sequences)—Would you agree that the subject clearly called . . . (a) . . . for the use of dramatic sequences? Yes___ No___ (b) Were the sequences done skillfully? Yes___ No___

7. Question: Would you agree that, in the case of this film, its strength was primarily in the visual elements and secondarily in the narration and other audio elements? Yes___ No___ If no, please comment.
Secondary Operational Generalization

8. When designing an instructional film, a major consideration must be to simplify and clarify the message as much as possible.

9. The instructional film narrator should not talk down or lecture to his audience.

10. While the optimum length of a film depends on the subject and the audience, an instructional film should seldom exceed 20 to 25 minutes.

Analysis

8. Question: Do you feel that the message was simplified and clarified as much as possible? Yes____ No____
   If no, please comment.

9. Question: Did you find any examples of the film's narrator . . . (a) . . . talking down to his audience? (To address the audience as if you are voluntarily coming down to the level of inferiors?) Yes____ No____
   (b) . . . lecturing to his audience? Yes____ No____

10. Question (for films exceeding 25 minutes): Considering the subject and intended audience, do you think this film could have been shortened to 25 minutes or less and still be equally as effective? Yes____ No____
APPENDIX K

TALLIED SCORES FOR PART 2 OF INSTRUCTIONAL FILM

ANALYZATION GUIDE
APPENDIX K

TALLIED SCORES FOR PART 2 OF INSTRUCTIONAL FILM ANALYZATION GUIDE

INSTRUCTIONAL FILM ANALYZATION GUIDE, PART 2
(For Panel Examination)

Film Title: _____________________________

Directions: Read the complete list of operational generalizations along with the accompanying analysis sections. View a film and reread each operational generalization, the analysis sections, and then respond to the questions. Please make any additional comments for any of the questions which would be helpful in explaining why you responded in the way that you did.

N/A denotes not applicable, i.e., some statements did not apply to every film.

Section A:

Primary Operational Generalization

1. Color can in some cases prove to be a distracting influence.

Analysis

1. Question: Did you notice any instances in which color was a distracting influence? Yes____ No____
   If yes, please list the specific examples.

   Yes ___ No 17 N/A 3
Primary Operational Generalization

2. There is some evidence that color should be used in media design, but the nature of its precise effect can, perhaps, not be assessed in terms of measurable outcomes of learning.

3. Film commentaries should be simplified as much as possible.

4. The commentary should avoid the use of unfamiliar names or technical terms.

5. Film narration should be designed so as to not have either too little or too much talk. In determining the right amount of talk, complexity of the material and the intellectual level of the audience must be taken into account.

Analysis

2. Question: If the film was produced in color, do you think black-and-white would have been equally as effective in terms of potential measurable learning gains? Yes____ No____. Give a specific reason for your answer.

   Yes_6     No_11     N/A_3

3. Question: In this film did you feel there were any instances in which the commentary was not simplified as much as possible? Yes____ No____
   If yes, please list the specific examples.

   Yes_0     No_16     N/A_4

4. Question: Did you notice any instances in which names or technical terms were used which might be unfamiliar to the intended audience? Yes____ No____
   If yes, please list the specific examples.

   Yes_2     No_14     N/A_4

5. Question: Considering the complexity of the material and the intellectual level of the intended audience, did you find any situations in which the narration contained... (a) ... too little talk? Yes____ No____
   (b) ... too much talk? Yes____ No____
Primary Operational Generalization

Analysis

If yes, please list the specific situations.

(a) Yes 0  No 17  N/A 3
(b) Yes 0  No 17  N/A 3

6. The visual image should be simplified as much as possible. Only the most relevant and necessary attributes should be included in the image. All irrelevant attributes should be excluded.

6. Question: Did you find in the film that irrelevant visual material was included which should have been omitted?
Yes____ No____
If yes, please list the specific instances.

Yes 3  No 17  N/A 0

7. Because man is a selective perceiver and is limited in the amount of information he can process, the rate of development of a film should be slow enough to permit him to grasp the material as it is shown.

7. Rate of development was defined by Carpenter and Greenhill as "the screen time devoted to each phase of the action."8

Question: Were there any instances in the film in which you feel the rate of development was not slow enough to permit the intended viewer to grasp the material as it was shown?
Yes____ No____
If yes, please list specific examples.

Yes 1  No 19  N/A 0

8Carpenter and Greenhill, "Informational-Instructional Film Production," p. 417.
8. The main function of introductions is to alert the audience as to what to expect and to thereby direct attention to relevant features. Summaries serve to restate and re-emphasize the main points.

9. Attention-directing devices (e.g., animation techniques, color, close-ups, slow or fast motion, unusual sounds, and the use of selected camera angles) may aid learning by calling attention to relevant parts of a visual which may otherwise be overlooked.

8. Question: If an introduction and summary were used, do you feel that the following statements describe their function—
(a) "The main function of introductions is to alert the audience as to what to expect and to thereby direct attention to relevant features." Yes__ No__
(b) "Summaries serve to restate and re-emphasize the main points." Yes__ No__

(a) Yes __ No__ N/A __
(b) Yes __ No__ N/A __

9. Note: A distinction can be made between devices used in films to direct attention of the audience as opposed to those which aim to gain attention. Attention-directing devices are used to direct attention to a portion of a visual (so that information will not be missed). Attention-gaining devices are used to attract attention to a film or to scenes or sequences of a film. The same effects (e.g., slow motion) can be used for either attention-directing or gaining. One film might use slow motion in the first scenes of the film to gain the audience's attention. In another film, slow motion may be used (along with pop-in arrows) to direct the attention to something happening within the visual.
10. Attention-gaining devices (such as zooms, music, extreme magnification, and stop motion) which call attention to irrelevant materials may interfere with learning of more important items.

In addition to the examples cited, other attention-directing devices to look for may include: (1) animation devices such as moving arrows, pop-in labels, and implosion, (2) cartoons emphasizing certain features of depicted objects, and (3) narration.

Question: Did you observe any examples of the use of attention-directing devices which called attention to relevant parts of a visual which may otherwise be overlooked? Yes_14 No_6 N/A_0

If yes, please list specific examples.

Yes_14 No_6 N/A_0

10. Such devices may be attention-gaining in their own right, but unrelated to the pictures or narration. Some examples might include (1) a picture of a pretty girl, (2) an athlete in frozen motion, (3) the use of unusual sounds such as train whistles, pistol shots, etc., and (4) sound tones to accompany processes such as the listing of five steps in order.

Question: Did you observe any examples of where attention-gaining devices were used which called attention to irrelevant materials

Yes_0 No_20 N/A_0
Primary Operational Generalization

Section B:

Secondary Operational Generalization

1. While man's attention is known to be drawn to that which is novel and complex, attention-gaining devices as used in instructional films apparently add little to an otherwise well-made film. (See examples cited in A-10 above.)

Analysis

which thereby interfered with the learning of more important items? Yes___ No___
If yes, please list the specific examples.

Yes 0 No 20 N/A 0

Analysis

1. In addition to the examples cited previously, look for the following: spotlighting, a fast pan as the first scene of a film, unusual camera angles, alternating commentators' voices, the giving of direction such as "Now see this!," slow emphatic reading of commentary, and supplying sound effects such as machine shop noises.

Question: Did you observe any examples of where attention-gaining devices were used? Yes___ No___

Yes 18 No 2 N/A 0
Secondary Operational Generalization

2. Optical effects (fades, dissolves) contribute little to the informational content of an instructional film . . .

   a. . . . but they can make an aesthetic contribution to a film.

3. In instructional films dealing with content which involves the affective domain (learning dealing with feeling states associated with attitudes, values, and appreciations), the main contribution of music is to help establish the mood and pace.

Analysis

2. Question: Did you observe any specific examples in which you felt that optical effects (fades, dissolves) contributed to the informational content of a film? Yes___ No___
   If yes, please list the specific examples.

   Yes ___ No 17 N/A 3

   a. Question: As used in the film viewed, do you agree that in some cases the optical effects (fades, dissolves) made an aesthetic contribution to the total production? Yes___ No___
   If yes, please list specific examples.

   Yes 11 No 6 N/A 3

3. Question (for films involving affective domain): Do you agree that the main contribution of music, as used in this film, was to help establish . . . (a) The mood? Yes___ No___
   (b) . . . The pace? Yes___ No___

   (a) Yes 14 No 0 N/A 6
   (b) Yes 13 No 1 N/A 6
Secondary Operational Generalization

4. Other than the contribution cited in the previous statement, music generally adds little to the informational content of an instructional film, except, of course, when the film deals with the subject of music.

5. The use of title and introductory music is probably justifiable from an aesthetic standpoint.

6. Dramatic sequences in instructional films should only be used when the subject clearly calls for it and then only when it can be done skillfully. Dramatic sequences are here defined as portions of a film in which the story or content is acted out by actors.

7. The strength of an instructional film should be primarily in the visual elements and secondarily in the narration and other audio elements.

Analysis

4. Question: With the exception of when a film deals with the subject of music, would you agree that music generally added little to the informational content of the film viewed? Yes____ No____

Yes 17 No 1 N/A 2

5. Question: Do you agree that title and introductory music was justifiable from an aesthetic standpoint? Yes____ No____

Yes 16 No 0 N/A 4

6. Questions: (for films containing dramatic sequences) -- Would you agree that the subject clearly called . . . (a) . . . for the use of dramatic sequences? Yes____ No____

(b) Were the sequences done skillfully? Yes____ No____

(a) Yes 7 No 2 N/A 11
(b) Yes 9 No 0 N/A 11

7. Question: Would you agree that, in the case of this film, its strength was primarily in the visual elements and secondarily in the narration and other audio elements? Yes____ No____

If no, please comment.

Yes 15 No 5 N/A 0
Secondary Operational Generalization

8. When designing an instructional film, a major consideration must be to simplify and clarify the message as much as possible.

9. The instructional film narrator should not talk down or lecture to his audience.

10. While the optimum length of a film depends on the subject and the audience, an instructional film should seldom exceed 20 to 25 minutes.

Analysis

8. Question: Do you feel that the message was simplified and clarified as much as possible
   Yes____ No____
   If no, please comment.
   Yes 18  No 2  N/A 0

9. Question: Did you find any examples of the film's narrator . . . (a) . . . talking down to his audience? (To address the audience as if you are voluntarily coming down to the level of inferiors.) Yes____ No____
   (b) . . . lecturing to his audience?
   Yes____ No____
   (a) Yes 0  No 16  N/A 4
   (b) Yes 1  No 15  N/A 4

10. Question (for films exceeding 25 minutes):
    Considering the subject and intended audience, do you think this film could have been shortened to 25 minutes or less and still be equally as effective? Yes____ No____
    Yes 8  No 2  N/A 10
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C. PUBLISHED REPORTS


D. ARTICLES IN ENCYCLOPEDIAS


E. UNPUBLISHED MATERIALS


