THE EFFECTIVENESS OF AN ART EDUCATIONAL FILM

AS A TEACHING TOOL

APPROVED:

[Signatures of Major Professor, Minor Professor, Director of the Department of Art, Dean of the Graduate School]
THE EFFECTIVENESS OF AN ART EDUCATIONAL FILM

AS A TEACHING TOOL

THESIS

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By

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CHAPTER I

INTRODUCTION

Recent interest in the use of educational films at the college level has been primarily concentrated on the problem of effectiveness of film in art instruction. The art educational film distributors are beginning to enjoy an economic boom caused by the growing acceptance of their products by the art world. Cinematographers and art educators are joining efforts to produce newer and more effective educational films. To keep up with this rapid influx of new films many educational institutions have established audio-visual departments; the personnel in these departments are often responsible for previewing new films, selecting films for institutional purchase, cataloging new films and repairing damaged films.

The world of art education has been slow to utilize the technical advancements that could bring about more effective teaching. Perhaps this unwillingness is due to a lack of knowledge about the new media or possibly to the financial limitations of the smaller schools. Some art instructors may be dismayed at the problem of threading a film projector; but
it seems that despite their reluctance, teachers would want to utilize any device that would make their teaching more effective. Possibly the art teachers question the effectiveness of teaching films in their field.

In the field of education there has been research and testing of the educational film. Hoban (4) has described the evidence that people learn from viewing films as "overwhelming." The findings also indicate that the educational film can teach factual information (4, 6) and perceptual-motor skills (5).

In the field of art the situation seems to be different. A search of current literature reveals no studies or descriptions of the learning which may or may not take place during an art educational film. It is the purpose of this study to test whether or not any learning does occur during the viewing of an art educational film. In order to examine this learning, an art educational film was developed and tested at North Texas State University in Denton, Texas.

The Problem and Its Purpose

The problem of examining the learning that occurred during the viewing of an art educational film was divided into four parts. The first part was to investigate related literature on educational film research, educational film
techniques, and on color, the subject of the film. The second part of the problem was to develop the testing tools, a 16 mm. color film and a color inventory test. The film was developed without narration in the hope that it would be successful in communicating the visual subject of color; the test was developed directly from the film script. Both the film and test development are discussed further in this chapter and are discussed in detail in Chapter III. The third part of the problem was to establish a testing procedure to be carried out on 120 female subjects at North Texas State University. The fourth part of the problem was to evaluate the learning that did or did not occur during the viewing of the film to discover the effectiveness of the film as a teaching tool.

Objectives

a. To evaluate the effectiveness of the film as a teaching tool.

b. To examine the learning that did or did not occur during the viewing of the art educational film.

c. To determine whether or not the motivation influenced the learning during the viewing of the art educational film.
Specific Problems to be Studied

a. Is the art educational film effective as a teaching tool?

b. Does measurable learning take place during the art educational film?

c. Does the motivation of a group of female subjects measurably influence their learning during the art educational film?

The Subjects

The subjects in this study were limited to 120 female students enrolled in Art 145 at North Texas State University in Denton, Texas. The Art 145 female students were selected because they represent the largest number of similar students enrolled in one class available in the Art Department at the time of this study. Female students were used as subjects because there was a limited number of male students available within the Art 145 classes.

The Testing Tools

The Film

The educational tool in this paper is a 16 mm. color film designed specifically to be a part of this study. The film
script is composed of brief statements concerning color; these statements are presented in the form of titles within the structure of the film. The film script is presented in Appendix A. This film was developed to bridge the gap between interest and learning. The related literature leading to its development is discussed in Chapter II; the development of the film and the actual filming techniques involved in its production are discussed in Chapter III.

The Tests

Two color inventory tests were designed as a part of this study to test whether or not any learning occurred during the viewing of the film. The tests are referred to in the text of this study as Test A and Test B; Test A is identical to Test B except for the fact that the questions are not in the same order. Both Test A and Test B are made up of sixteen accept-or-reject statements about color. The tests were developed directly from the film script which is presented in Appendix A. Test A is presented in Appendix B; Test B is presented in Appendix C. A thorough discussion of the test material can be found in Chapter II, and the test itself is discussed in Chapter III.
Procedure

The 120 female Art 145 subjects were tested at North Texas State University along with their male classmates, whose test scores were disregarded. The subjects were divided into four testing situations in order to carry out the objectives of this study.

Group I.— The nature of this study was explained to this group, composed of thirty female subjects. They were told that they would first be tested with a color inventory test (Test A) and they would see a film concerning color. They were also told before seeing the film that they would be tested a second time following the film. After the film they were given the second color inventory test (Test B). This procedure was utilized to determine whether or not any learning took place during the film.

Group II.— The nature of this study was explained to this group, composed of thirty female subjects. They were told that they would see a film concerning color and then they would be tested with a color inventory test. They viewed the film and then took the color inventory test (Test A). This procedure was utilized to determine whether or not the motivation of knowing about the forthcoming test effected the learning that did or did not occur during the film.
Group III. - The nature of this study was not explained to this group, composed of thirty female subjects. They were told that they would see a film concerning color. After they had seen the film, they were asked to take the color inventory test (Test A). This procedure was utilized to determine whether or not the absence of motivation effected the learning that did or did not occur during the film.

Group IV. - The nature of this study was explained to this group, composed of thirty female subjects. They were told that they would be given a color inventory test (Test A) and then they would be given a second color inventory test (Test B); the group took both tests. This group was established as a control group to determine whether or not any learning occurred without the stimulus of the film.

Definitions

Educational Film: This term refers to a film made for the purpose to impart knowledge to people who have assembled to learn. This film can illustrate and inform upon matters difficult to describe verbally to bring first-hand knowledge to an audience (1).

Color Inventory Test: These tests were designed as a part of this study to test the effectiveness of the teaching
tool. Both Tests A and B are presented in Appendix B and Appendix C, respectively.

**Significant Learning:** In this study this term refers to learning on the part of the subject that is meaningful, important, and of consequence (2).

**Motivation:** This term refers to the stimulation of interest and encouragement on the part of the testor (3, p. 31); in this study knowledge of the forthcoming test that will be experienced by the subjects after the film is considered motivation since it introduces a learning task to the subjects.

**Art Educational Film:** This term refers to a film that has been designed to teach specific skills about art information. The art educational film in this study will be designated as "the film" in later chapters in order to facilitate the discussion.
CHAPTER BIBLIOGRAPHY


CHAPTER II

Related Literature

For approximately fifty years, research has produced empirical evidence to support the fact that both children and adults learn from films and other forms of pictorial representation. Experimental study of the educational film in classroom instruction began shortly after 1915. In 1918 Sumstine (20) published School and Society, which was a forerunner in the research of the motion picture's role in the classroom.

Within six years of Sumstine's study, research on films began to develop rapidly. Hoban (10) relates that the general problem attacked was the instructional function of the educational film in relation to other visual aids such as slides and maps. Another early researcher was Freeman (8), who conducted research at the University of Chicago to study and compare various educational films with other visual and non-visual methods of instruction. He reported that the addition of educational films to the school curriculum resulted in about a fifteen percent increase in the "kind of learning
measured by standardized tests." The studies at The University of Chicago revealed the educational film to be superior over other visual aids because it depicted movement, aroused interest, and held the attention of the audience.

From 1924 to 1930 several studies on film were conducted. Wood and Freeman (8), under a grant from The Eastman Kodak Company, determined the contribution of the motion picture when used as an integral part of classroom teaching:

a. The film motivated greater pupil activity in the area being studied.

b. The film increased factual learning.

c. The film improved descriptive processes.

d. The film promoted understanding of causes, effects, and relationships.

Around 1930 the element of sound was introduced to the previously silent motion picture film. There is inconsistency in the study results in which the silent and sound films were compared. In nearly all studies, the measurement of effectiveness has been in terms of the verbal responses of subjects on objective factual information tests. There seems to be general agreement by Einbecker (7) and Westfall (21) that oral narration on a film is more effective than a film without
narration. Einbecker's data indicated that the silent picture accompanied by the teacher's comments was superior to narrative on the film. The Westfall study indicated that a mechanically-produced lecture was significantly superior to any other kind of verbal support. Both of these studies seem limited in view of recent technical advances in the film industry.

In the 1930's there were many studies made of the influences of the commercial motion picture on learning ideas, changing attitudes, and the reinforcing of behavior patterns. These studies were carried out by the Payne Fund Studies (16); as a direct result of their influence, Hollywood established a board for controlling "propriety and morality" in their film productions. The educators of the 1930's seemed to do little about the findings of the Payne Fund Studies; in fact, only the bravest of school systems and universities established film libraries at that time.

The outbreak of the second world war caused film-conscious governments to use the power of film to aid their war efforts. Film was utilized by those involved in the war effort for large-scale propaganda. This was most prominently utilized in England where films were shown in the bomb shelters during German bombing raids (4). This use of the motion picture seems to be education via film in the strictest sense.
There has been recent research on the effectiveness of films in the teaching of English. One study prepared by Sheridan, Owen, Macrorie, and Marcus (18), was carried out under the auspices of a grant to the National Council of Teachers of English. In another similar study, Baker (1) published in 1964 the results of his research in "Film as Sharpener of Perception." He maintained that our primary need is for a tool to make students learn to look at and record the details that make meaning.

In the field of professional education, Brown and Thornton (3) conducted an experiment with two groups of students; one group viewed film and slide sequences of situations relative to the course. The other group observed and studied real classroom and school situations; both of these groups made an attempt to observe the same things. The study was conducted to determine whether or not the students who had enrolled in these courses which required observation learned more from the film presentation or from seeing the actual situation. In general, the students who had seen the film presentation achieved a slightly higher score on their examination.

Several art educators have called for and praised the utilization of films in art curricula. H. Conant (5, p. 42)
regards art films as an essential part of an art education program, and implies that the institutions of higher learning must build art centers in which adequate instructional programs as well as instructional art films may be housed. D'Amico (6) states that the museums and schools should concern themselves not only with presentation and interpretation of original art, but also with the communication media such as motion pictures. Despite the fact that these and other art educators have praised the use of films in art curricula, there is limited research on the effectiveness of films in this area.

The success of the educational film has been greatly attested by Herman (9). He establishes that the mere fact that thousands of educational systems rely on many educational films to carry a great deal of the teaching burden significantly underlines the beneficial potentials of educational films.

Lunsdaine's (13) study of the film as an instructional media in "Instruments and Media of Instruction" contains an objective criticism of educational films and emphasizes the fact that many of these films do not have a concise educational objective. The experimental research and the evaluative
studies do substantiate that a good audio-visual tool is an effective teaching device.

The educational film that is used in schools and institutions today is a complicated and unique piece of work. It probably has been developed and produced by a staff of personnel composed of a director, a producer, writers, cameramen, and editors. It is this group that works to make one film better than the next. However, there are other factors that influence the quality of a film; the handling of the cinematic techniques and photography contribute to the film's quality; and equally important is the application of the learning tendencies of the intended audience (11).

In his book, *Educational Films: Writing, Directing and Producing for Classroom, Television and Industry*, Lewis Herman states:

> It is assumed that the broad purpose of every educational film is to aid the viewer in solving some sort of problem - mechanical (as in skill-and-drill films), sociological, emotional, or the multitude of other problems that beset mankind. It is essential, therefore, that a film purporting to teach must first isolate the basic problem to be solved by the viewer. And it must teach the viewer how to identify that problem and use what he has learned. It must appeal to audiences of similar age, interests, environment, education, vocations, ambitions, and attitudes (9, p. 14).
Herman also discusses learning and interest. He implies that the viewer must be vitally interested and must want to learn from the film before he can become informed. To add interest it is possible to entertain with cinematic techniques; this type of film can be used to stimulate interest initially, and to continue attention during the film; the essence of the photography can be used to reinforce the material that is being learned.

Thus the film develops from a screen play or script which is the "blueprint" for those who are to produce the film (11). The director is selected by the producer (9); it is this director who seems to have the last word—his word is law during the production. The director selects such things as the cast, various moods of the film, multiple exposures, the length of the film, the number of shots per day, and whether or not superimposition of two shots fits the film's script.

The cameraman is the technician responsible for the lighting and photography; in his job he must know about the spotlights, the camera, camera angles, camera viewpoints, close-up shots, depth of focus, diffusers, exposure, the exposure meter, the focus, soft focus, and the lens. He is sometimes referred to as the director of photography (9); he is also responsible
for loading the film into the film magazine and for winding and rewinding the camera. (Most professional movie cameras do not wind now because they are motor driven.)

The film editor is responsible for assembling the complete film from its various component shots and sound tracks (9). He cuts the film between the frames and puts it together to achieve continuity; he places the credits in the film; and he determines what kind of cut to employ (such as a jump cut). Reisz (17), director and writer, together with a committee appointed by the British Film Academy, compiled a study of the technique of film editing. Their study is primarily concerned with the manipulation of photography and the process of editing.

The film script is written in great detail in order to save valuable time during the filming; sometimes in short animated films a storyboard is written instead of a script. The script in this paper required research on the subject of color. This study explores various ideas that several color experts and artists have advanced concerning color. These opinions are interpreted and are focused so the diversified facts and judgments can be used to develop the script and storyboard for the teaching tool.
Numerous authorities have written about color and have attempted to define its attributes. Maerz and Paul (14, p. 11) relate that color can be defined in three different ways. From the physics angle, color is defined as "radiant energy;" from the psychophysics view, color is defined as "the response of the human retina to the physical stimuli;" and from the psychological point of view, color is defined as "a visual sensation, existing only as a temporary consciousness in the mind."

Munsell (15) relates that color is "that quality of a thing or appearance which is perceived by the eye alone, independently of the form of the thing; subjectively, a sensation peculiar to the organ of vision, and arising from the optic nerve." He also states that the color variables are chroma, brightness and hue; and he emphasizes that chroma is a color sensation's degree of departure from gray or white, is the "intensity of distinctive hue," and is "color intensity." Munsell described hue as the "respect in which red, green, blue, etc., differ from another," and he defined value as "the relation of one object... to others with reference to light and shade."
In the text of his book, *Creative Color*, Birren (2) states that there are tints which are formed by the mixing of pure colors with white; he relates that there are shades which are formed by the mixing of pure colors with black, and that tones can be formed by the mixing of pure colors with both black and white.

Luckiesh (12) reports that there are two ways of mixing color; one method is by subtraction of light rays and the other method is by addition of light rays. The subtractive primary colors, used by painters, craftsmen, and graphic designers, are known as red, yellow and blue. The additive primary colors, used by impressionist painters, stage lighting crews and photographers, are known as red, green and blue.

The relationship of the colors is important. Sargent (18) relates that each color is closely related to another color which is called its complement; the complement of any color can be detected by the after-image of that color. The split complementary relationship of colors has been called the near complements; in this relationship of two complements one of the colors is not used, but instead the two colors on either side of it on the color wheel are combined with the original complement (17). Colors which are adjacent to each other are considered to be analogous (2, p. 46),
while one color mixed with black and white is considered monochromatic. Colors which are equidistant from each other on the color wheel are called triads (17).

Definitions

**Camera.** - This term refers to the apparatus used for securing photographic images on film - in this instance, 16 mm.

**Camera Angle.** - In filming this is the angle of view subtended at the lens by the portion of the subject included within the picture area (11).

**Cameraman.** - This is the technician responsible for the lighting and photography of a film.

**Close-up.** - This term refers to a shot taken with the camera actually or apparently very close to the subject; in relation to a human subject this would mean a picture of the face only (9).

**Continuity.** - The problem of the director and editor is to give the total film smoothness of transition from one part of the film to another; the spectator's attention should be carried from one scene to the next without any displeasing breaks or discrepancies (9).

**Credits.** - This term refers to the film title placed somewhere in the film; the title and names of players and
technicians should be in the credits (11).

**Cut.** - This is the transition between two shots linked together by a simple joint, which gives the impression during projection that the first shot is suddenly and instantaneously displaced by the second. This term can also refer to the prospects of trimming and joining together of shots in the editing. Even another meaning for this term is to terminate a shot; this word is used as an instruction by the director to the cameraman to stop the camera at the end of a take (11).

**Depth of Focus.** - In a camera lens this is the extent to which a lens will clearly focus near and distant objects at the same time (9).

**Diffuser.** - In any photography work there is a necessity in softening light; this device is a screen made of silk, frosted glass or any other suitable material which is placed in front of a studio lamp to diffuse its light (9).

**Edit.** - The verb edit means to assemble a complete film from various component shots.

**Exposure.** - This refers to the length of time a single frame of film in the camera is exposed to the action of light in shooting (11).

**Exposure Meter.** - This instrument is used for gauging
the amount of exposure to be given to a film to secure the best possible result under any given lighting conditions (11).

Film. - In photography work this is the perforated ribbon of celluloid which has been coated with photographic emulsion that is used in cinematography (11).

Focal Length. - This term refers to the distance from the optical center of the lens to the principal focus (11).

Focus. - This verb refers to the adjusting of a lens so that it produces a sharply-defined image.

Frame. - In movie photography this is the one single transparent photograph or picture of the series printed on a length of 16 mm. film.

Jump Cut. - This refers to a cut which breaks the continuity of time by jumping forward from one part of an action to another.

Lens. - This is the transparent refracting medium, usually glass, bounded by two surfaces of which one is curved and the other flat or curved; the lens is used for concentrating of dispersing light rays according to certain optical laws (11).

Load. - This term refers to the placing of a roll of unexposed movie film into a camera ready for shooting.

Magazine. - In the camera this is a box or container for holding the roll or spool of film.
Multiple Exposure. - When two or more exposures are made on the same series of film frames, it is called a multiple exposure (11).

Shot. - This refers to a fragment of moving picture which has been taken, actually or apparently, in one running of the camera (11).

Soft Focus. - By shooting slightly out of focus, it is possible to get a slightly hazy effect which is called soft focus.

Spotlight. - This term refers to a lamp capable of projecting a narrow beam of light onto a small area such as in a film studio or on a stage.

Superimpose. - This refers to the printing of two shots, one on top of the other on the same length of film, so that when projected on the screen each can be seen through the other (9).
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8. Freeman, Frank N., E. H. Reeder, and Jean A. Thomas, "An Experiment to Study the Effectiveness of a Motion Picture Film Which Consists Largely of Tables, Maps, and Charts, as a Means of Teaching Facts of Giving Abstract Information," Visual Education, University of Chicago Press, 1924, pp. 258-274.


CHAPTER III

DESCRIPTION OF THE TESTING DEVICES

Development of the Color Tests

The color inventory tests used in this study were developed to test the effectiveness of the film as a teaching tool. Test A was designed to be given to every group; Test B was designed to be given to Groups I and IV, the only groups taking both tests. Test A can be seen in Appendix B, and Test B can be seen in Appendix C. Both Test A and Test B are composed of sixteen accept or reject statements based on the film script which may be seen in Appendix A. Each test statement consists of a brief sentence concerning color; each statement can be answered in a short time period. Since Test A and Test B are identical except for the question order, everything that is discussed about Test A is also true of Test B.

The study of color sensation is more than the simple stimulation of the optic nerve; it is the awareness with hue relationships, color textures, and "harmonies of balanced tones" (8). In order to learn about color, it is necessary
to discuss its attributes; thus a color vocabulary is beneficial to the art student. Birren (1) has referred to the color terms as "the tools of the trade."

Color is a matter of perception (8) and the word "color" implies the "consideration of the appearance of a surface or material object" (5, p. 69). Jacobson (3, p. 20) relates that the uniqueness of color is in the mind. The first question on Test A requires the subject to accept or reject the statement that color is a sensation perceived by the eye and transmitted to the brain.

In order to describe any given color tone, it is necessary to consider the qualities of hue, value, and chroma (intensity) (8). According to Luckiesh (5, p. 70) the "quality of any color can be accurately described by determining its hue, saturation or purity, and its brightness." His reference to "brightness" is analogous to what some colorists term "value" because Luckiesh considers white, black, and gray as colors. The fifth question of Test A requires the subject to accept or reject the statement that color may be described in terms of hue, value, and chroma (intensity).

Hue refers to the chromatic quality of color that is indicated by its name. In order to change a hue, another hue
must be mixed with it. Jacobson (3, p. 28) relates that the "color circle shows how the colors vary in hue. A yellow may be made redder or greener. A red may be made yellower or bluer. A blue may be made redder or greener. A green may be made bluer or yellower." According to Luckiesh (5, p. 70), the "hue is suggested in the name applied to the color." The third question of Test A requires the subject to accept or reject the statement that hue is the relative brilliance of color. The sixteenth question of Test A requires the subject to accept or reject the statement that rose is a reddish hue.

Value refers to a color's relationship to white and to black. In order to change a color's value, it is necessary to mix it with some color either lighter or darker than the original color. The physicist in working with lights refers to value as brightness (5, p. 70). The sixth question of Test A requires the subject to accept or reject the statement that the value of color is the intensity of the color. The thirteenth question on Test A requires the subject to accept or reject the statement that value is the lightness or darkness of a color.

Chroma refers to the intensity or color strength of a hue as it is compared with gray (8, p. 6). This comparison
is indicated when dull green is contrasted to bright green. In order to change the chroma or intensity of a color, it is necessary to mix it with a "grayer color" (8). The eleventh question in Test A requires the subject to accept or reject the statement that the chroma is the relative intensity of a color.

According to Maerz and Paul (6, p. 8), the term "tint" has had a complicated history of meanings. Since the fourteenth century it has had a variety of meanings and for a long time was synonymous with the general word "color." About the middle of the nineteenth century, it began to acquire the present-day meaning of a light color or a color mixed with white. The seventh question on Test A requires the subject to accept or reject the statement that the tint of a color is mixed by using the color itself plus white.

The term "shade" is derived from the old English word "scaed" meaning partial darkness (6, p. 9). It began to acquire its present meaning of "lower brightness" (6) or of a hue mixed with black, around the middle of the nineteenth century. According to Luckiesh (5, p. 71), various shades can be produced by the adding of black to a color. The ninth question on Test A requires the subject to accept or reject
the statement that the shade of a color is mixed by using the color itself plus black.

According to Birren (1), the term "tone" refers to a color plus black plus white. The fourth question in Test A requires the subject to accept or reject the statement that the tone of a color is mixed by using the color itself plus black.

Luckiesh (5, p. 54) relates that there are two methods of mixing color. One method is called "subtractive;" in this method the three subtractive or pigment primary colors can be superimposed or mixed to form black or the extinction of color. The subtractive mixing methods are utilized by painters and craftsmen (5). The second question on Test A requires the subject to accept or reject the statement that pigment colors are used by painters and other graphic artists. The tenth question on Test A requires the subject to accept or reject the statement that the pigment primary colors tend to form black when mixed together. The fourteenth question requires the subject to accept or reject the statement that pigment colors mix by addition.

Luckiesh (5, p. 57) states that the additive method of mixing "light" color "tends toward the production of white."
The additive method of mixing color is used in stage lighting (5, p. 272), and color photography (5, p. 213). The eighth question on Test A requires the subject to accept or reject the statement that the "light" primary colors and color system are used by photographers in filming. The twelfth question on Test A requires the subject to accept or reject the statement that the "light" primaries mix to form white. The fifteenth question on Test A requires the subject to accept or reject the statement that "light" colors are formed by subtraction.

As a part of the test the 120 subjects were asked to answer several specific personal questions, if they chose to do so. These questions included facts such as the subject's age, college major, and the number of art courses completed at the college level. This data and its relationship to the various test scores is discussed further in Chapter IV.

These color inventory tests were designed as a part of this study to test whether or not any learning occurred during the viewing of the film. The effectiveness of the film was evaluated on the basis of the testing results; the evaluation of this study is discussed in Chapter V.
Development of the Film

Film Materials

The film materials selected for this study were chosen because they are available to most photographers. These materials have been thoroughly tested in laboratories; thus detailed specifications on the materials' performance under controlled conditions are available. These specifications are most helpful because they accurately define the performance and limitations of the materials under any condition. The technical photographic materials are listed and described in Appendix D.

Stage lighting gels were used for the brilliant color effects. These lighting gels are available in a large variety of hues, and the thin acetate sheets can be quickly cut to any desired shape or size.

Prestype, the dry transfer alphabet was selected for the titling work because it is easy to apply to the ground paper; it is easy to read even when magnified to screen size; and it is available in various colors including white which was necessary for this study. Futura demi-bold twelve point type (7, p. 24) was selected because the simple characters are easy to read. (See Figure 1, page 33.)
The PIGMENT primary colors (formed by subtraction)

Fig. 1--An example of a film title using futura demi-bold twelve point type.
Black construction paper which served as the background was selected because it is inexpensive and exhibits the necessary matte finish to photograph under the glare of photo-flood lighting.

The glass prisms and tubes used extensively for dispersing the flat stage lighting gel's colors into patterns of color were selected for their transparent and reflective qualities. (See Figures 2 and 3, pp. 35 & 36.)

A household wire cake cutter used experimentally during the filming, was moved in front of the lens in a non-focus position to cause peculiar color fracturing as exhibited in the film as horizontal ripples of color. (See Figure 4, page 37.)

**Preparation**

The primary concerns for this educational film are to exhibit relevance, accuracy, organization, comprehensibility, and interest (2). This film was designed to be used for college level learning ability and it contained authentic and factual information. The teaching material was structured so that a suitable filming sequence evolved. In order for this film to effectively communicate its information, every effort was made to make it comprehensible and yet appealing.
Fig. 2—An example of glass tubes dispersing the stage lighting gels as seen in the film.
Fig. 3—An example of glass tubes dispersing the stage lighting gels as seen in the film.
Color may be described in terms of:
1. hue
2. value
3. chroma (intensity)

Fig. 4—An example of horizontal ripples of color as seen in the film.
Before creating the script and the storyboard of this film, a survey of information concerning color was conducted. In the storyboard each visual sequence and composition was studied for optimum understanding of the color information and for graphic design. The transition and flow between film sequences were studied to provide content unity. Since redundant irrelevancies might lead to diffusion of audience interest, the storyboard was planned carefully before any of the actual filming was initiated.

It was discovered through two pilot films that colored stage lighting gels produced better photographic color than acrylic paints, another source of color. The glare of the studio lights was too difficult to control; thus gels were used throughout the filming to achieve color effects.

It was necessary to devise a way to put titles on the film, since a narrative sound track was financially out of the question. It was decided to double expose the 16 mm. film in the camera. Thus the color work could be photographed on one film exposure and the titles, on a second exposure. To keep the colors from being overexposed, white letters were used on a matte black background; the camera shutter was stopped down one number for the titling work; and the color images were taken before the titles were photographed.
A ten by twelve inch rectangle was cut in a studio table; the opening enabled the photofloods to shine up into the working area. Two layers of white organza were stretched over the opening; this material diffused the photofloods enough to equally light the entire rectangular opening. A sheet of plate glass was placed over the organza to hold the material in place and to provide a smooth working surface. It was on this glass-covered area that the entire color work for the film was photographed.

The Filming Procedure

As the filming began, several experiments were conducted. The stage lighting gels were filmed on the first exposure; they were laid over the glass working area in various patterns; glass tubes, glass prisms and other objects were placed in front of the camera lens in a non-focus position. In several instances during the film it is possible to see these materials. These experimental devices were used to cause the flat gel colors to fracture and mix to form graphic patterns.

The camera recorded what had been planned and written on the storyboard. The camera footage was carefully noted alongside the storyboard as the filming progressed. Because the camera - subject relationship was geared to creating a visual
experience, all of the color work was done first to avoid changing this relationship. The camera position was often unchanged through several 100 foot rolls of film; to have moved the camera between each roll of film to the photographing of the titles would have broken the gradual build-up of visual design.

The white titles on the background were photographed on the second exposure. To ready the film for this second exposure, it was necessary to go into the darkroom and rewind the exposed film manually back onto the original film spool. Careful attention was paid to the relationship of the first composition to the second. The movie camera was used as a copy camera as it recorded the titles at a focal distance of six inches. In some instances, such as when the words "dull green" appear in the titles, there is a good example of dull green in the color pattern, but there was no basic plan to relate the titles to the color images. (See Figure 5, page 41.)

The film was processed by a local film company; the processed film was edited for clarity and simplicity before it was tested at North Texas State University. The test results are discussed in Chapter IV, and the effectiveness of the film is discussed in Chapter V.
Chroma is the relative brilliance or intensity of a color, e.g. bright green or dull green.

Fig. 5—An example of the relationship between a title and the color as seen in the film.
The Testing Procedure

The subjects were asked to read the directions before beginning the test. They were also asked to fill in the information at the top of the test, if they cared to do so. They were strongly encouraged to fill in every blank and to answer every question even if they were not sure of the answer. The directions asked the students to read color statements and to decide whether or not they could accept or reject each one individually. If they could accept a statement as being true, they were instructed to place the letter "A" in the provided blank in front of the statement. If they rejected a statement as being false, they were instructed to place the letter "R" in the provided blank in front of the statement.

Group I. — The nature of this study was explained to the three separate classes who made up this group. The females in the classes were tested along with their male classmates, whose test scores were disregarded. The group was told that they would first be tested with a color inventory test (Test A) and they would see a film concerning color. They were also told prior to seeing the film that they would be tested a second time following the film. After they viewed the film, they were given the second color inventory test (Test B).
This testing procedure was established to determine whether or not any learning took place during the film. The testing results are discussed in Chapter IV.

Group II.—The nature of the study was explained to the three separate classes who made up this group. The females in the classes were tested along with their male classmates, whose test scores were disregarded. The group was told that they would see a film concerning color and then they would be tested with a color inventory test. They viewed the film and then took the color inventory test (Test A). This testing procedure was established to determine whether or not the motivation of knowing about the forthcoming test effected the learning that may have occurred during the film. The testing results are discussed in Chapter IV.

Group III.—The nature of the study was not explained to the three separate classes who made up this group. The females in the classes were tested along with their male classmates, whose test scores were disregarded. The group was told that they would see a film concerning color. After they had viewed the film, they were asked to take the color inventory test (Test A). This testing procedure was established to determine whether or not the absence of motivation effected
the learning that may have occurred during the film. The testing results are discussed in Chapter IV.

Group IV.—The nature of the study was explained to this group which was composed of three separate classes. The females were tested along with their classmates, whose test scores were disregarded. They were told that they would be given a color inventory test (Test A) and then they would be given a second color inventory test (Test B); the group took both tests. This group was established as a control group to determine whether or not any learning occurred without the stimulus of the film. In this situation the actual scores of the individual subjects is not as important as the difference between their first and second test scores. The results of the testing is discussed in Chapter IV.

Definitions

Storyboard: This planning is the second development of the film; it directly follows the drafting of a script. In the storyboard the film ideas are studied and are placed in a logical sequential order. The order is then broken down into kinesthesia, which is the length of time required for a specific movement on the screen; it is important in this type of experimental work that the minute details of the storyboard are not conceived until the filming develops.
Script: This term refers to the written record of the scenes, shots and/or dialogue of a film prepared for the purposes of production.

Stage lighting gels: This term refers to the transparent acetate or plastic sheets of color used extensively in lighting effects for theatrical productions. The gels are available in a wide variety of colors.
CHAPTER BIBLIOGRAPHY


5. Luckiesh, M., Color and Its Application, Norwood, Massachusetts, The Plimpton Press, 1921.


CHAPTER IV

ANALYSIS AND INTERPRETATION OF RESULTS

The Testing

The testing results of the four groups have been defined in five different ways. The mean scores of each group derived from the designated tests are presented in Table I, page 49. The frequency distribution scores of each group derived from the designated tests are presented in Figures 6, 7, and 8, pp. 55, 56, & 57. A comparison of correct answer scores of each group are presented in Table II, page 50. The per cent improvement in test scores of Groups I and IV are presented in Table III, page 51, and the per cent difference in the test scores of Groups II and III are presented in Table IV, page 53.

The mean test scores of each group were calculated on the basis that a score of sixteen is the highest possible score. In order to facilitate the handling of data, it was necessary to rearrange the questions and scores of Test B in the same order of the Test A questions. For example, question two of Test B is the same as question two of Test A, and question five of Test B is the same as question five of
Test A, as seen in Table I. The Test A questions are presented in Appendix B.

The mean Test A scores for Group I, which was preconditioned with Test A prior to viewing the film, were 10.7 correct test answers. The mean test scores for Test B, which was taken after viewing the film, were 13.1 correct test answers. The mean scores of Group I may be seen in relation to the mean scores of the other groups in Table II, page 50. The difference between the mean scores reveals the amount of learning that occurred during the film. This difference was 2.4 correct test answers; this improvement was a 15.0 per cent gain in color information. The per cent improvement of Group I may be seen in Table III, page 51.

In contrast to the 15.0 per cent increase in color information which occurred in Group I, the testing results of Group IV reveal a mean increase of 0.6 per cent. The mean Test A scores for Group IV, which did not view the film at any time during this study, were 12.1 correct test answers. The mean scores for Test B, which was taken immediately following Test A, were 12.2 correct test answers. The mean scores of Group IV may be seen in relation to the mean scores of the other groups in Table II, page 50. The difference between the mean scores
**TABLE I**

**CORRECT ANSWER SCORES FOR INDIVIDUAL QUESTIONS FOR ALL GROUPS**

<table>
<thead>
<tr>
<th>Question Number</th>
<th>Group I**</th>
<th>Group II**</th>
<th>Group III**</th>
<th>Group IV**</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Test A</td>
<td>Test B*</td>
<td>Test A</td>
<td>Test A</td>
</tr>
<tr>
<td>1</td>
<td>30</td>
<td>30</td>
<td>29</td>
<td>30</td>
</tr>
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<td>2</td>
<td>25</td>
<td>30</td>
<td>29</td>
<td>24</td>
</tr>
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<td>14</td>
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<td>24</td>
<td>17</td>
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<tr>
<td>4</td>
<td>18</td>
<td>21</td>
<td>22</td>
<td>24</td>
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<td>5</td>
<td>27</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>6</td>
<td>19</td>
<td>21</td>
<td>22</td>
<td>20</td>
</tr>
<tr>
<td>7</td>
<td>28</td>
<td>30</td>
<td>29</td>
<td>27</td>
</tr>
<tr>
<td>8</td>
<td>15</td>
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<td>9</td>
<td>21</td>
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<td>25</td>
</tr>
<tr>
<td>11</td>
<td>26</td>
<td>30</td>
<td>28</td>
<td>27</td>
</tr>
<tr>
<td>12</td>
<td>5</td>
<td>28</td>
<td>19</td>
<td>19</td>
</tr>
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</tr>
<tr>
<td>16</td>
<td>25</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
</tbody>
</table>

| Total           | 321       | 393        | 393         | 375        | 363      | 366     |

*Test B Scores have been rearranged to correspond to Test A scores.

**30 subjects per group.**


**TABLE II**

**MEAN SCORES**

(The highest obtainable score is 16.)

<table>
<thead>
<tr>
<th>Groups</th>
<th>Test A</th>
<th>Test B</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>10.7</td>
<td>13.1</td>
</tr>
<tr>
<td>II</td>
<td>13.1</td>
<td>----</td>
</tr>
<tr>
<td>III</td>
<td>12.5</td>
<td>----</td>
</tr>
<tr>
<td>IV</td>
<td>12.1</td>
<td>12.2</td>
</tr>
</tbody>
</table>
### TABLE III

**PER CENT IMPROVEMENT IN TEST SCORES FOR GROUPS I AND IV**

<table>
<thead>
<tr>
<th>Question</th>
<th>Group I</th>
<th>Group IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>2</td>
<td>16.7</td>
<td>-6.7</td>
</tr>
<tr>
<td>3</td>
<td>-13.3</td>
<td>3.3</td>
</tr>
<tr>
<td>4</td>
<td>10.0</td>
<td>-3.3</td>
</tr>
<tr>
<td>5</td>
<td>10.0</td>
<td>0.0</td>
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<tr>
<td>6</td>
<td>6.7</td>
<td>6.7</td>
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<td>7</td>
<td>6.7</td>
<td>6.7</td>
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<td>8</td>
<td>46.6</td>
<td>3.3</td>
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<td>9</td>
<td>-10.0</td>
<td>-3.3</td>
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<tr>
<td>10</td>
<td>16.7</td>
<td>0.0</td>
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<tr>
<td>11</td>
<td>13.3</td>
<td>-10.0</td>
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<tr>
<td>12</td>
<td>76.7</td>
<td>13.3</td>
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<tr>
<td>13</td>
<td>6.7</td>
<td>3.3</td>
</tr>
<tr>
<td>14</td>
<td>30.0</td>
<td>-3.3</td>
</tr>
<tr>
<td>15</td>
<td>6.7</td>
<td>3.3</td>
</tr>
<tr>
<td>16</td>
<td>16.7</td>
<td>-3.3</td>
</tr>
<tr>
<td><strong>Mean</strong></td>
<td><strong>15.0</strong></td>
<td><strong>0.6</strong></td>
</tr>
</tbody>
</table>
reveals the amount of learning that occurred between the tests. This difference was 0.1 correct test answers; this improvement was a 0.6 per cent gain in color information. The per cent improvement of Group IV may be seen in Table III, page 51.

The mean test scores for both Groups II and III were studied together in order to satisfy the objectives of this problem. The mean test scores for Group III, which was motivated previous to their film experience, were 13.1 correct test answers. The mean test scores for Group III, which was not motivated prior to the viewing of the film, were 12.5 correct test answers. The mean scores of Groups II and III was 0.6 correct test answers; the motivated Group II achieved 3.8 per cent more color information than the non-motivated Group III. The per cent differences between the test scores of Group II and Group III may be seen in Table IV, page 53.

The frequency distribution scores on both Test A and Test B varied among the four groups. These scores represent the number of correct answers on the sixteen-question color inventory test. The mode scores or the most frequent scores in Group I on Test A were ten and eleven; both of these scores were achieved by six subjects. The mode scores in Group I on
TABLE IV

PER CENT DIFFERENCE IN TEST SCORES BETWEEN GROUPS II AND III BY QUESTION

<table>
<thead>
<tr>
<th>Question Number</th>
<th>Per Cent Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-3.3</td>
</tr>
<tr>
<td>2</td>
<td>16.7</td>
</tr>
<tr>
<td>3</td>
<td>23.3</td>
</tr>
<tr>
<td>4</td>
<td>-6.7</td>
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<tr>
<td>5</td>
<td>0.0</td>
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<td>6</td>
<td>6.7</td>
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<tr>
<td>7</td>
<td>6.7</td>
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<tr>
<td>8</td>
<td>-6.7</td>
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<tr>
<td>9</td>
<td>0.0</td>
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<td>10</td>
<td>0.0</td>
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<tr>
<td>11</td>
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<td>12</td>
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<td>13</td>
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<tr>
<td>14</td>
<td>16.7</td>
</tr>
<tr>
<td>15</td>
<td>0.0</td>
</tr>
<tr>
<td>16</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Mean | 3.8
Test B were fourteen and fifteen; both of these scores were achieved by five subjects. The frequency distribution profiles of Group I may be seen in Figure 6, page 55.

The mode score or most frequent score in Group IV on Test A was eleven; eight subjects achieved this score. The mode score in Group IV on Test B was thirteen; seven subjects achieved this score. The frequency distribution profiles of Group IV may be seen in Figure 7, page 56.

The frequency distribution scores for both Group II and Group III were studied together in order to satisfy the objectives of this problem. The mode score in Group II was thirteen; eleven subjects achieved this score. The mode scores in Group III were ten and thirteen; seven subjects achieved these scores. The frequency distribution profiles of Groups II and III may be seen in Figure 8, page 57.

The correct test answers from each of the four groups were studied. In Group I it was noted that there were three unrelated factors influenced by the film. One factor was a gain in color information; this is evidenced in the Test B correct answer scores for questions two, four, five, six, seven, eight, ten, eleven, twelve, thirteen, fourteen, fifteen, and sixteen. (See Table I, page 49.) The second factor was
Figure 6 — Frequency distribution polygon profile of Group I
Figure 7—Frequency distribution polygon profile of Group IV
Figure 8—Frequency distribution polygon profile of Groups II and III
no change in color information; this is evidenced in the Test B correct answer score for question one. (See Table I, page 49.)

The third factor resulted in a loss of color information; this is evidenced in the Test B correct answer scores for questions three and nine. (See Table I, page 49.)

In Group IV it was noted that there were three unrelated factors influenced by the fact that this group did not view the film. One factor was a gain in color information; this is evidenced in the Test B correct answer scores for questions three, six, seven, eight, twelve, thirteen, and fifteen. The second factor was no change in color information; this is evidenced in the Test B correct answer scores for questions one, five, and ten. (See Table I, p. 49.) The third factor was a loss of color information; this is evidenced in the Test B correct answer scores for questions two, four, nine, eleven, fourteen, and sixteen. (See Table I, p. 49.)

The correct answer scores for Group II and Group III were compared. Group II, which was motivated previous to the viewing of the film, scored higher on eight of the sixteen Test A questions than did Group III, which was not motivated prior to viewing the film. Group II scored the same as Group III on six Test A questions; Group III scored higher than Group II on only two test questions. (See Table I, page 49.)
The per cent improvement of the test scores of Groups I and IV were studied. The loss or gain of information between Test A and Test B were calculated by studying each question individually. This information is presented in Table III, page 51. It is interesting to note that during the film Group I gained 46.6 per cent or over three times their original color information (as evidenced in Test A) on question eight. On question twelve Group I gained 76.6 per cent or over five times their original information during the film. On question fourteen Group I gained 30.0 per cent over their original information during the film. (See Table III, p. 51.)

The per cent differences between the test scores of Group II and Group III were compared to satisfy the objectives of this study. It was found that Group II learned 3.8 per cent more than Group III. The results of the comparison of the individual questions are presented in Table IV, page 55.

Discussion

Some interesting aspects developed from this study. In Group I there were no perfect scores on Test A. However, after viewing the film four subjects scored sixteen, the highest possible score on the color inventory test (Test B). These subjects who performed equally well on the second test
did not perform equally on the first test; one subject scored eight on the first test (Test A); another scored eleven, and two others scored fourteen on the first test (Test A). The film improved the color information of all the subjects.

There was a tendency for the disregarded male subjects to score higher than their female classmates in all of the groups. Their tests were graded in order to examine any possible trends; their numbers were too few to establish statistical evidence on their performance.

The average art experience of the Art 145 female subjects was 4.2 semesters of art classes at the college level. The art experience tended to have little effect on the results of the test scores and the learning. The subjects who scored perfectly on any of the color inventory tests had an average of 3.8 semesters of art experience at the college level.

Discussion of Objectives and Special Problems

It has been found that the art educational film was effective as a teaching tool; its effectiveness was measured and established by the testing of the individual gains and losses that occurred in Group I between Test A and Test B. The amount of color information gain and loss that occurred during the viewing of this art educational film has been presented in this chapter. (See Table III, page 51.)
It has been proven that measurable learning occurs during the viewing of this art educational film. In Group I the learning yielded a 15.0 per cent increase in color information; in Groups II and III the learning yielded lesser increases in color information.

It was proven that the pre-film motivation of the thirty female subjects in Group II influenced their learning during the film; Group II achieved a mean score of 13.1 correct test answers. Group III, which was not motivated, achieved a mean score of 12.5 correct test answers. Thus the motivated group learned 3.8 per cent more color information than the non-motivated group.

Definitions

Frequency distribution: This term refers to a "method of presenting a set of data in an economical fashion." This avoids the redundancy of listing identical scores (l, p. 9).

Polygon profile: This term refers to a type of figure created by points and lines to represent the frequency of scores; each point is connected by a line. Thus "when the frequency is zero, the point is located on the baseline of the figure" (l, p. 11).
**Frequency distribution polygon profile:** This term refers to a figure which represents the frequency of occurrence; the points on the scale are used to represent a score's frequency; and point is connected by a line. This method of presenting data is easier to read and study than a list of scores (1).

**Mode:** This term refers to the most frequent score in the distribution (1).

**Mean:** This term refers to the "sum of all the scores in the distribution divided by the total number of scores" (1, p. 53).
CHAPTER BIBLIOGRAPHY

CHAPTER V

SUMMARY

The Problem

The objectives of this study were to evaluate the effectiveness of the art educational film as a teaching tool. The study also examined the measurable learning that occurred during the viewing of the film, and determined whether or not the motivation influenced the learning during the viewing of the art educational film.

The specific problems studied were:

1. Is the art educational film effective as a teaching tool?

2. Does measurable learning occur during the art educational film?

3. Does the motivation of a group of female subjects influence their learning during the art educational film?

Procedure

The 120 female subjects tested in this study were selected from the Art 145 classes at North Texas State University in
Denton, Texas. The Art 145 classes represented the largest number of similar students enrolled in the same laboratory class in the Art Department at the time of this study. The subjects were divided into four testing situations in order to carry out the objectives of this study. It was necessary to utilize three Art 145 classes to make up the required number for each group; the female subjects were tested along with their male classmates whose test scores were disregarded because their number was too small to establish statistical evidence on their performance. The subjects were tested in the regular laboratory classrooms in the Art Building.

Group I. - The nature of this study was explained to this group, composed of thirty female subjects. They were told that they would first be tested with a color inventory test (Test A) and they would see a film concerning color. They were also told before seeing the film that they would be tested a second time following the film. After the film they were given the second color inventory test (Test B). This procedure was utilized to determine whether or not any learning took place during the film. The measurable learning of Group I was compared to the measurable learning of Group IV who did not view the film.
Group II. - The nature of this study was explained to this group, composed of thirty female subjects. They were told that they would see a film concerning color and then they would be tested over the material in the film; they viewed the film and then took the color inventory test (Test A). This procedure was utilized to determine whether or not the motivation of knowing about the forthcoming test effected the learning that may have occurred during the film. The measurable learning of Group II was compared to the measurable learning of Group III, which was not motivated prior to the viewing of the film.

Group III. - The nature of this study was not explained to this group, composed of thirty female subjects. They were told that they would see a film concerning color. After they had seen the film, they were asked to take the color inventory test (Test A). This procedure was utilized to determine whether or not the absence of motivation effected the learning that may have occurred during the film. The measurable learning of Group III was compared to the measurable learning of Group II, which was motivated prior to the viewing of the film.

Group IV. - The nature of this study was explained to this group, composed of thirty female subjects. They were told
that they would be given a color inventory test (Test A) and then they would be given a second color inventory test (Test B); the group took both tests. This group was established as a control group to determine whether or not any learning occurred without the stimulus of the film. The measurable learning of Group IV was compared to the measurable learning of Group I, who viewed the film after taking Test A and before taking Test B.

Results

The scores derived from the tests just described were studied and analyzed. The results and comparisons of those tests can be found in Tables I through IV in Chapter IV. In this study it was proven that the art educational film was effective as a teaching tool; its effectiveness was measured and established by the testing of the individual gains and losses that occurred in Group I between Test A and Test B. The amount of color information gain and loss that occurred during the viewing of this art educational film was presented in Chapter IV. It has been proven that measurable learning occurs during the viewing of this art educational film. In Group I the learning yielded a 15.0 per cent increase in color information. This was evidenced by the fact that Group I
achieved a mean score of 10.7 correct Test A answers before viewing the film. After viewing the film they achieved a mean score of 13.7 correct Test B answers. The difference between the mean scores represents a net gain in color information of 2.4 correct test answers or a net gain of 15.0 per cent.

It was proven that the pre-film motivation of the thirty female subjects in Group II influenced their learning during the film. Group II achieved a mean score of 13.1 correct test answers; Group III, which was not motivated prior to viewing the film, achieved a mean score of 12.5 correct test answers. Thus the motivated group learned 3.8 per cent more color information than the non-motivated group.

Conclusions

The subjects who were tested both before and after viewing the film exhibited a measurable gain in color information from the art educational film concerning color. The subjects who were motivated prior to viewing the film exhibited a tendency to gain more color information than those subjects who were not motivated prior to viewing the art educational film concerning color. The subjects who did not see the film concerning color exhibited a tendency to gain color information
between Test A and Test B; however, these subjects exhibited less gain in color information than the subjects who were tested both before and after viewing the film. The art experience of the subjects did not tend to affect the color information gain or loss which occurred during the viewing of the film. Of all the groups tested, the preconditioned and motivated groups achieved the largest gain in color information. Both the group which was preconditioned with Test A prior to viewing the film, and the group which was motivated prior to viewing the film, achieved the identical high mean scores of 13.1 correct test answers as presented in Table II.

Suggestions for Further Study

Since this study involved only the teaching of color information, the author feels that further study is needed to investigate the effectiveness of art educational films in other art areas such as design, drawing, painting, color mixing, art appreciation, and art history. These areas could be examined by testing within existing college curricula in the same manner as this study was conducted. With permission from the film producers and film distributors, it would be possible to explore the potential of their products, for it seems
necessary that art educators utilize the film products to discover their effectiveness. It would be useful to investigate the current film products to establish the effectiveness of those teaching tools already on the film market. Thus existing art educational films could be evaluated for their effectiveness in the classroom.

Further work needs to be accomplished in the area of learning to discover whether or not art students and other visually-oriented students learn more effectively from visual or verbal stimuli. This study seems to be more urgent in the art field where many of the visually-oriented students are found. In connection with this study there is also a need to know whether or not the audio stimulus of an art educational film effects the learning of these visually-oriented students.

There is a definite need for research to examine what factors effect the learning which occurs during an art educational film. In this study the students' backgrounds and previous art experience should be studied to determine whether or not their art experience influences the students' ability to learn different types of physical, mental, or social skills which are found in art educational films.

Further research in the study of students who are attending different academic institutions is suggested to determine
if the data will vary from one locale to another. If larger numbers of students could be utilized in this type of study, the additional data would provide more extensive knowledge about the learning that occurs during an art educational film.

It is also suggested that the testing of male as well as female subjects is desirable to determine if sex of the subject affects learning. If larger numbers of male students could be utilized in this type of study, the additional data would provide more extensive knowledge about the learning that occurs during the viewing of an art educational film.

It is recommended by the author that the testing be adapted to computer grading to facilitate a more complete interpretation of the findings. The hand grading used in this study was lengthy and required constant checking for human error. Thus a reliable computer test could be utilized to strengthen this study.

Further work needs to be done to determine if the student of high intelligence or the student of low intelligence learns more effectively from an art educational film. There is no evidence of recent study in this area; if any trends could be established from this data, the film producers, educators, and students would benefit from the findings.
Since the study of art educational films involves the film quality itself, further study needs to be done in the field of cinematography to establish whether or not certain camera techniques influence the learning of the viewer. This study could be accomplished by the development of several films, each teaching the same material; each of the films could be photographed in a different manner so that it utilizes one camera technique or one group of techniques more than any other. The traditional "black and white" approach to the art educational film is quickly becoming "old hat" as the newer teaching films with fresh approaches in camera techniques and film processing are becoming more numerous.

Further investigation is needed to extensively study the kinds of learning that occur during the viewing of an art educational film. The author feels that it is necessary to not only measure the extent of the learning, but also to examine the quality of learning. For example, there is a need to measure and evaluate the retention and understanding of the mental skills learned during the viewing of an art educational film.

Since this study was conducted at the conclusion of Art 145, a course designed to teach the element of color, it
is suggested that further study be conducted at the beginning of such a course to determine whether or not the experience of the class influenced learning during the film. The author feels that the effectiveness of the art educational film should be determined by both data from experienced and unexperienced classes.
APPENDIX A

THE FILM SCRIPT: "ROSE IS A REDDISH HUE"
Designed and photographed
by Ann Robinson

What is color?

Color is a sensation perceived by the eye and transmitted
to the brain.

Color may be described in terms of:
1. hue
2. value
3. chroma (intensity)

Hue is the quality by which we distinguish one color
from another: e.g., rose is a reddish hue.

Value is lightness and darkness of a color: e.g., pink
is a lighter value than red.

Chroma is the relative brilliance or intensity of a color:-
e.g., bright green or dull green.

Tint = color + white.

Shade = color + black.

Tone = color + white + black.

The PIGMENT primary colors (formed by subtraction)

Secondary colors are mixed from the primary colors.

The PIGMENT primary colors are used by:
painters
craftsmen
graphic artists
The PIGMENT primary colors mix to form black.

The LIGHT primary colors (formed by addition)

Secondary colors are mixed from the primary colors.

The LIGHT primary colors are used by:
  - impressionist painters
  - stage lighting crews
  - photographers

The LIGHT primary colors mix to form white.

Analogous

Complementary

Split Complementary

Triad
APPENDIX B

TEST A

NAME_____________________ AGE____ SEX_____ MAJOR____________

NUMBER OF ART COURSES YOU HAVE HAD IN COLLEGE____ HOW MANY YEARS

DID YOU TAKE ART IN ELEMENTARY AND SECONDARY SCHOOLS____ IF YOU

HAVE TAKEN PRIVATE ART LESSONS, HOW MANY YEARS____

READ THE FOLLOWING STATEMENTS AND DECIDE WHETHER YOU ACCEPT

OR REJECT THEM INDIVIDUALLY. IF YOU ACCEPT A STATEMENT AS

BEING TRUE, PUT THE LETTER "A" IN THE BLANK. IF YOU REJECT A

STATEMENT, PUT THE LETTER "R" IN THE BLANK.

_____ Color is a sensation perceived by the eye and transmitted to the brain.

_____ PIGMENT primary colors and other PIGMENT colors are used by painters and other graphic artists.

_____ Hue is the relative brilliance of a color.

_____ The tone of a color is mixed by using the color itself plus black.

_____ Color may be described in terms of hue, value, and chroma (intensity).

_____ The value of a color is the intensity of the color.

_____ The tint of a color is mixed by using the color itself plus white.

_____ The LIGHT primary colors and LIGHT color system are used by photographers in filming.
The shade of a color is mixed by using the color itself plus white plus black.

When mixed together, the PIGMENT primary colors tend to form black.

Chroma is the relative intensity of a color.

The LIGHT primary colors mix to form white.

Value is the lightness or darkness of a color.

PIGMENT colors mix by addition.

LIGHT colors are formed by subtraction.

Rose is a reddish hue.
APPENDIX C

TEST B

NAME________________________

READ THE FOLLOWING STATEMENTS AND DECIDE WHETHER YOU ACCEPT OR REJECT THEM INDIVIDUALLY. IF YOU ACCEPT A STATEMENT AS BEING TRUE, PUT THE LETTER "A" IN THE BLANK. IF YOU REJECT A STATEMENT, PUT THE LETTER "R" IN THE BLANK.

_____ Hue is the relative brilliance of a color.

_____ The value of a color is the intensity of the color.

_____ The shade of a color is mixed by using the color itself plus white plus black.

_____ The LIGHT primary colors mix to form white.

_____ LIGHT colors are formed by subtraction.

_____ Rose is a reddish hue.

_____ PIGMENT colors mix by addition.

_____ Value is the lightness or darkness of a color.

_____ Chroma is the relative intensity of a color.

_____ When mixed together, the PIGMENT primary colors tend to form black.

_____ The LIGHT primary colors and color system are used by photographers in filming.

_____ The tint of a color is mixed by using the color itself plus white.
Color may be described in terms of hue, value, and chroma (intensity).

The tone of a color is mixed by using the color itself plus black.

Color is a sensation perceived by the eye and transmitted to the brain.

PIGMENT primary colors and other pigment colors are used by painters and other graphic artists.
APPENDIX D

THE CAMERA

The Bolex H-16 Rex-4 movie camera was used because it offers perfection in composition, focus and versatility not found in other cameras in its price range. This camera has been called a masterpiece of mechanical and optical precision; thus professional film effects can be produced in the camera by means of the following features:

Reflex viewing. — The through-the-lens viewing system gives the photographer complete control of composition, framing, and accurate focus on the ground glass with correct evaluation of depth of field. This camera contains a prism system so that the image in the viewfinder can be viewed without flicker during the actual filming.

Film rewind. — The unlimited rewind factor in this camera made it possible to double expose any part of the film without removing it from the camera; this advantage was necessary because special film effects, such as the film titles, were double exposed.
Counters. - This camera contains a built-in frame counter which counts the individual frames in forward and reverse filming and in single framing work; it also contains a built-in footage counter. This type of frame counter enables the photographer to know what material is on any part of the 100-foot roll of film.

The Lens

The qualities of the Macro-Switar 50 mm. f/1.4 lens enable the filming to be done at a close range, such as on a studio table top; this telephoto lens has an eleven by eight degree angle of view and will focus from infinity to a minimum of fifteen inches; at the minimum focusing distance it will photograph a rectangle of 1 7/8 inches by 1 3/8 inches.

The Light Meter

The cadmium sulphide resistor light meter is manufactured by Gossen and is made expressly for the Bolex camera; it fits into a shoe which is mounted on the top and front portion of the camera.

The Tripod

The pan head tripod used with the Bolex 16 mm. camera is constructed of heavy large diameter aluminum tubing. The
tripod has two features that are particularly advantageous for close-up photography work: The built-in spikes in the legs can be imbedded in the plywood filming table for positive location and registration. The pan head can be reversed so that the camera is between the tripod legs, which lowers the center of gravity of the tripod and camera, and thus gives even more stability to the arrangement.

The Photofloods

Sylvania movie lights of 375 watts designed for color movie photography are good inexpensive photofloods. They are small in size and are convenient to move in the filming studio; the lights have been color corrected so no filter is necessary when they are used with Kodachrome II Type A movie film; these photofloods may be used on any household circuit.

The Film

Kodachrome II Type A movie film was selected for this study because it is a slow, very fine-grain film that has been balanced for exposure with photoflood lamps in studio lighting situations.
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