8-1-1977

Techniques for Preparing 35-MM Title Slides to Enrich Mediated Instruciton in Industrial Arts Education

Keith A. Stenehjem

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TECHNIQUES FOR PREPARING 35-MM TITLE SLIDES

TO ENRICH MEDIATED INSTRUCTION IN

INDUSTRIAL ARTS EDUCATION

by
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Bachelor of Science, University of North Dakota, 1976

A Thesis

Submitted to the Graduate Faculty

of the

University of North Dakota

in partial fulfillment of the requirements

for the degree of

Master of Science

Grand Forks, North Dakota

August
1977

This Thesis submitted by Keith A. Stenehjem in partial fulfillment of the requirements for the Degree of Master of Science from the University of North Dakota is hereby approved by the Faculty Advisory Committee under whom the work has been done.

(Chairman)

Dean of the Graduate School

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<u>Permission</u>

Title   Techniques for Preparing 35-mm Title Slides to Enrich

          Mediated Instruction in Industrial Arts Education

Department   Industrial Technology

Degree   Master of Science

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ACKNOWLEDGEMENTS

The researcher wishes to extend his appreciation and gratitude to Dr. Myron Bender, Chairman, Department of Industrial Technology, University of North Dakota, for his incitement and criticism during the research and preparation of this thesis.

The researcher also wishes to extend his appreciation to the other members of his advisory committee: Dr. Wan Lee Cheng, Assistant Professor, Industrial Technology, and Mr. Neil Price, Chairman, Department of Library Science and Audiovisual Instruction.

The researcher further wishes to extend his thanks and appreciation to his parents, Mr. and Mrs. Ove Stenehjem, for their encouragement and support during this period of his education. Also to his wife, Loree, for her help and understanding.

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ABSTRACT

The nature and scope of this study was a library-descriptive research project designed to investigate and experiment with selected photographic techniques that can be used by a classroom instructor in preparing 35-mm title slides in industrial arts education.

The specific objectives formulated for this study were: (1) to conduct a literature search, (2) to review and analyze techniques used in preparing title slides for educational media, (3) to identify and select five techniques to be used as the basis of this study by a predetermined criteria, (4) to experiment with the selected techniques used in producing title slides, and (5) to evaluate and compare the selected techniques for the purpose of recommending those more adaptable in a given situation for mediating industrial arts education.

The five selected photographic techniques for producing title slides chosen for experimentation in this study were: (1) the Manipulation Technique, (2) the Double-Exposure Technique, (3) the Kodalith-Film Technique, (4) the Sandwich-Slide Technique, and (5) the Slide-Duplicator Technique.

The conclusions drawn from this research project were: (1) the Manipulation Technique is very suitable where funding and equipment is very limited with resulting title slides being excellent, (2) the Kodalith-Film and Sandwich-Slide Techniques are acceptable where some funding is available to purchase supplies and equipment with resulting

title slides being good to excellent, (3) the Double-Exposure and Slide-Duplicator Techniques could be very valuable if proper equipment is available. The equipment available for these techniques at the time of the study was limited which resulted in average to good title slides due to the many failures that occurred.

CHAPTER I

INTRODUCTION

Audiovisual materials have been among the resources used for teaching and learning in educational programs for many years. Usually they have been used as supplementary sources to aid instructors in the classroom and are considered secondary to verbal presentations by instructors, textbooks, chalkboard, library materials, and other traditional and convenient methods of communication. For this reason audiovisual materials generally are considered as aids to instruction.

In the past, utilization of audiovisual equipment was limited due to several factors: equipment and materials had to be scheduled long in advance, machines were cumbersome and difficult to operate, rooms needed darkening, and so on. Consequently, these factors have been the major cause for inhibiting instructor acceptance and utilization of media in their instruction.

Today, however, technology has made audiovisual media more feasible by providing better equipment and more suitable facilities for their utilization.

> As increasing recognition is given to the audiovisual media and as
> more suitable facilities are provided for their use, we will see
> increased dependence on various media to serve many instructional
> purposes—and not as enrichment devices to be used if time permits,
> but rather as carefully planned and integrated parts of the teaching-
> learning environment (1, p. 3).

With the increased use of audiovisual materials in industry more and more commercial materials have been made available to schools. This vast flow of commercial materials, however, has often left much to be desired with respect to the instructors immediate instructional needs because of the materials content. For example, typical classroom commercial audiovisual materials include many concepts and generally students cannot grasp and retain all these concepts at one time. Furthermore, possibly only a section of the material presented has the content that specifically pertains to the topic under study. Or again, the treatment of the subject may not be handled in the way the instructor wanted to present it.

Statement of the Problem

There exists a critical need to prepare visuals to improve instruction in industrial arts education. The purpose of this study was to investigate and experiment with selected photographic techniques that can be used by a classroom instructor in preparing 35-mm title slides in industrial arts education.

In order to fulfill the purpose, it was necessary to meet the following objectives:

1. To conduct a literature search

2. To review and analyze techinques used in preparing title slides for educational media

3. To identify and select five techniques to be used as the basis of this study by a predetermined criteria

4. To experiment with the selected techniques used in producing title slides

5. To evaluate and compare the selected techniques for the purpose of recommending those more adaptable in a given situation for mediating industrial arts education.

Need for the Study

The need for this study was dictated by the cost of commercially produced slide presentations and the absence of local applications in existing materials.

> The lack of existing instructional materials having local applications, the trends in new class groupings that require new types of resources, and a number of personal values, all justify the local application of audiovisual materials (2, p. 3).

Commercially produced materials are often too general in nature to meet the needs of diversified audiences. Consequently, instructor produced mediated materials become a necessity to comply with course objectives. This also allows the instructor to update slides to keep the content current. Furthermore, instructor-prepared materials add local emphasis that is more meaningful to a class or group (2).

Hocking made this comment about producing slides locally:

> I feel the greatest contribution of the 2 by 2 slide is its ability to be teacher produced. Not like the filmstrip, the sequence can be changed; slides can be shuffled and reshuffled . . . such areas as architectural drafting and carpentry lend themselves well to this medium (3, p. 26).

Most school systems today have access to audiovisual equipment. The problem is in purchasing commercial audiovisual materials to utilize with the available equipment. Many school systems do not have the funding to purchase such materials.

For a minimal cost a school system can purchase or make the necessary equipment to develop their own 2-by-2-inch slide presentations.

This requires basic understanding of the 35-mm single-lens reflex camera and the format for producing slide presentations.

The actual "snapping" of the shutter to get slides is not any problem. One must first prepare a storyboard to know what to photograph and then send the exposed film to a photo-lab for development. The problem is producing a slide presentation which has professional qualities that add and hold interest. One of these qualities is title slides.

Title slides are produced by many different techniques, some elementary and others complex. The more feasible techniques are those which require little time, equipment and funding but give quality results.

Edgar Dale, a well known specialist and author dealing with audiovisual materials, stated this about the use of audiovisual materials:

> Why is it worth your while to master the use of audiovisual materials? Because these materials properly used, offer great opportunity for improving learning. This is not merely the best reason; it is the only practical reason (4, p. 3).

Assumptions

The writer assumes that the reader has basic understanding of the 35-mm single-lens reflex camera and previous knowledge of producing mediated materials such as the slide presentation, which may be obtained from Eastman Kodak's pamphlet S-30, Planning and Producing Slide Programs.

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Limitations of the Study

This study was limited to:

1. The available equipment the writer had access to within the facilities of the Department of Industrial Technology, University of North Dakota, at the time of the study

2. The production of 2-by-2-inch title slides with the use of the 35-mm single-lens reflex camera

3. The five selected techniques for producing title slides.

Definition of Terms

For the purpose and convenience of this study, selected terms were defined as indicated:

Title Slides - Slides which serve to introduce the viewer to the subject of which there are four categories: main-, credit-, sub-, and end-titles.

Single-lens Reflex Camera - A compact camera employing a mirror or prism for accurate viewing directly through the camera lens (1, p. 245).

Audiovisual Materials - Television, films (8-mm, 16-mm, 35-mm), videotapes, sound filmstrips, 35-mm slides, printed materials with recorded sound, study trips, and demonstrations.

Mediated Instruction - A form of instruction using audiovisual materials to convey concepts.

Commercially Prepared Materials - Materials used in instruction which are purchased from a company which produces audiovisual materials.

Copystand - A vertical or horizontal stand for accurately positioning a camera when photographing flat subjects very close to the lens (1, p. 243).

Close-up Lens - A series of screw on lens usually +1, +2, and +3 to enable the concentration of the camera on the subject.

Storyboard - A series of sketches or pictures which visualize each topic or sequence in an audiovisual material to be produced.

Projectuals - Instructional materials which may be projected for presentation in a classroom situation.

CHAPTER II

REVIEW OF LITERATURE

Mediated Instruction in Education

In today's vast array of educational offerings there is no area of the curriculum that is outside of the ever widening scope of educational media. Industrial education is certainly no exception to this statement (3).

Never in the history of civilization have visual instruction materials played such an important role in the communication process.

May and Lundsdaine made this statement about mediated instruction: "One of the major conclusions of previous research is that film and other graphic materials and qualities have proved to have value for instruction at all levels and for certain parts of a great many school subjects" (5, p. 4).

Proceeding on the basic assumption that projectuals are worth utilizing in the classroom, Clayton W. Chance (6, pp. 17-18) conducted an experiment utilizing projectuals. One instructor divided freshman engineering students into two groups: those who received instruction from transparencies, and those who were taught by the usual chalkboard methods.

The results of Chance's study were as follows: The transparency group did significantly better at the end of the course than the

chalkboard group. Moreover, it was determined that approximately fif-
teen minutes of each sixty minute class lecture could be saved by the
transparency medium. As indicated by the total number of questions,
attentiveness was greater in the experimental group and both instructor
and students preferred this method.

Edgar Dale concludes that audiovisual materials are no longer
on trial.

> Clearly, a good deal of evidence from research supports a general
> conclusion we have already made: Properly prepared audiovisual
> materials can help us teach our subject matter with increasing ef-
> fectiveness at all levels of learning. The fundamental idea of
> audiovisual instruction, then is no longer on trial, just as edu-
> cation through textbooks and laboratory techniques is, practically
> speaking, no longer on trial. We use audiovisual materials con-
> fidently as a part of a modern educational system (7, p. 140).

Research has shown that visual materials do have a positive ef-
fect on the learning process and that teaching time is reduced. Since
we are aware that oral, written and visual presentations are all effec-
tive methods of communication, it is apparent that any or all of these
methods can be combined in one format. Some of the advantages of a
multi-media presentation include renewed student interest, ease in pre-
senting a complex theory, and an appeal to more than one of the human
senses (8).

Further study of visual versus verbal presentation was carried
out with a group of 673 elementary school children in Cleveland, Ohio
(9). In this study students were selected from the fourth, fifth, and
sixth grades and consisted of both black and white boys and girls.

Experimental conditions consisted of three groups: group one
replied to verbal stimuli, group two replied to visual stimuli and
group three to both verbal and pictorial stimuli. All stimuli were

presented on black and white 35-mm slides. Nouns such as rabbit, pillow and telephone were used in word and picture form for groups one and two. For group three, both the picture and the word appeared on the same slide. Thirty-five stimuli were flashed on a screen at ten second intervals and the students were required to respond with the first word that came to their minds.

The results of the study were tabulated in two categories: sensory and nonsensory. It was evident from the final tabulations that verbal rather than visual stimuli produced better sensory responses. Furthermore, tabulations also revealed that visual stimuli were superior when specific and less abstract responses were sought.

In a more specific study of visuals, Chan, Travers and Van-Mondfrans (10) conducted auditory versus colored visual research at the University of Utah. The study involved 166 psychology students which were divided into groups of four to six and assigned to either group A or group B. The students in group A responded to colored syllables and taped syllables. Group B students responded to black and white syllables and taped syllables. Each group viewed eight syllables and listened to eight different syllables. After the presentations, each group wrote down in separate column the syllables remembered from the audio and from the visual.

The results indicated that the total amount of learning for both groups was the same. However, more was learned visually by group A than by group B, but at the expense of the audio portion; and both groups scored higher on the visual syllables than on the auditory syllables.

Mediated Instruction in Industrial
Arts Education

In industrial arts education the utilization of audiovisual materials can be a great asset in presenting industrial processes, demonstrations and lectures.

Yeager conducted an experimental study involving junior high school students enrolled in industrial arts electricity in the Dallas and Houston school system (11). The purpose of the investigation was to determine the effectiveness of an experimental method in which the normal teaching time was reduced by one-third. Compared to control methods of lecture, discussion and demonstration, the experimental method included the aforementioned supplemented with projectuals. Groupings were equated by multiple bases of randomization, mental abilities and pre-experimental statuses as indicated by pretests.

Four instructors, representing different schools varying in enrollment from 750 to 1,400 students, participated in the investigation. All students were eighth and ninth grade boys taking their first formal course in basic electricity. Each instructor taught two experimental classes and two control classes. Ten test scores were collected for each student.

Selected units were used in the study rather than involving the entire course of study. These units were as follows: 1) Basic fundamentals of electricity, 2) Magnetism, 3) Ohm's law and power formula, 4) Circuits, and 5) AC-DC electricity. Lesson plans were constructed for the selected units and each unit presented was limited to twenty-one minutes for control classes and fourteen minutes for experimental

classes. Review times covering these units were fifty minutes for the control group and thirty-five minutes for the experimental group. Twenty-nine projectuals were developed in conjunction with the experimental method and the lesson plans.

To the extent that the samples were reflective of the parent population, the selected projectuals were representative of all electricity projectuals, and the data were factual and reliable. The following four conclusions were made: 1) A positive relationship prevails among mental ability scores, spatial ability scores and pretest scores among individual junior high school industrial arts students enrolled in basic electricity courses. 2) As compared to teaching time required by control methods of lecture, discussion and demonstration, teaching time required by the same items supplemented with projectuals can be successfully reduced by one-third. 3) Final test scores indicated not only that review time for such texts can be favorably reduced by one-third, but also that the experimental method is superior to the control method at the 0.01 level of confidence. 4) Achievement between experimental and control upper mental levels, between experimental and control middle mental levels, and between experimental and control lower mental levels is not affected by the different methods.

The field trip has been a form of instruction which has been very effective in industrial arts education classes. Wilber and Pendered, both well known industrial arts educators and authors, stated that:

> The industrial trip is one of the most valuable forms of instructional media utilized in industrial arts education. It is especially effective because of its realism. The student is not confronted with a picture of a verbal presentation of industry, but observes the real thing. His impressions are first-hand; he

hears, smells, and sees industry and technology at work. Depending on the nature of the trip, his senses of touch and taste may be involved as well (12, p. 316).

Unfortunately, unless located in an industrial area it is extremely difficult for an instructor to arrange a field trip relating to industrial arts education. The principle reasons for this are the cost and scheduling problems. Also, more and more industries are not allowing field trips because of safety standards and environmental control, which is a big factor in the food industry.

There has been some research done in the area of slide-tape presentation versus the field trip. In 1969, Goldsburg (13) made a study of field trips taken vicariously through slide-tapes. The investigation involved 251 third grade students who were divided into three groups. One group experienced a field trip directly; the second group experienced the same field trip vicariously through a slide-tape presentation; the third group saw the slide-tape presentation and then experienced the field trip. Parallel forms of a text covering facts, concepts, and attitudes were administered in pre- and post-testing.

The finding revealed that the combination of a slide-tape and direct experience was the most effective of the three approaches used. Vicarious field trips (slide-tape presentations) were revealed to be more effective than the direct experience of the field trip itself. These results suggest that instructors may improve the educational effectiveness of a field trip through the use of a slide-tape presentation as a supplement to the actual visit. The study also showed that vicarious field trips via slide-tape are a good substitute for the actual trips.

The alternative to the industrial visit, as Pendered writes
(14), is a vicarious field trip which has none of the disadvantages of
the real trip. The instructor can produce the slide-tape presentation,
tailor it to fit the instruction and schedule it at the most opportune
time in the course. Each student gets the same exposure, sees the
same scenes and hears the same narrative. A slide-tape presentation
can often depict certain industrial processes more clearly and more
safely than a real trip. This factor overcomes a serious disadvantage
of the actual trip in which the students cannot see the process clearly
nor hear the tour guide's explanation. Another advantage is that it is
effective with both large and small groups as well as with individuals,
such as absentees.

Producing the Slide Presentation

Visuals are meant to draw attention to one concept. Therefore,
accurate, careful planning must be exercised if effective visuals are
to be prepared. Simplicity and briefness are the basic guide lines for
effective visuals. Color is a vital factor in any format but not to the
extent that colors distract from the basic point presented.

Intelligent planning of visuals within the framework of a stan-
dard guide, careful editing and allowance for adequate time for prepara-
tion will go a long way toward assuring the production of satisfactory
visuals at minimum cost (15).

When making a slide presentation you have to keep each slide
simple, not too congested, because the person viewing the slide has to
retain its concept in a matter of seconds. The series should be color-
ful and with the element of surprise if possible. The length of the

series is not important as long as it is presented in a manner that keeps the viewer's attention. Television has contributed greatly in this type of instruction because the viewer through television has grown accustomed to absorbing large amounts of information in eight to ten seconds (16).

St. John also disclosed, "A picture is worth a thousand words, but a slide isn't worth a syllable if it doesn't say anything or says too much" (16, p. 18).

The instructor may discuss the information covered in the text and project a slide presentation, prepared before the class, to support the lecture. In this way students become more involved in the subject. Also, the knowledge that the instructor actually made the visuals would be even more impressive and could promote the idea that the instructor is interested in the subject and in fact does "practice what he preaches" (17).

Harold Sullivan pointed this out about a slide presentation, "An informative talk, supplemented by colorful slides can be very effective if proper technique is used" (18, p. 236).

When proper conditions for projecting the material being shown can be met, it is usually preferable to use a projector for presenting the material to view. Here are some of the reasons Eastman Kodak (19) presented on direct viewing versus projection:

Economy of Space and Convenience - Charts and other graphics have to be large enough to provide adequate visibility in a thirty foot classroom (30 by 40 inches). If there are several materials they present a real problem in storage; also they are very cumbersome to handle.

When converted to transparencies, charts lose this awkwardness.

Versatility - A chart is restricted to do a specific maximum viewing distance. A transparency on the other hand can be used with a wide range of audience sizes by employing the correct combination of screen and projector.

Effectiveness - The compactness of the transparency presentation makes it practical to employ the technique of progressive disclosure in developing a topic. This together with elimination of the physical distraction of manipulating a large number of charts makes the presentation by projection more effective.

Cost - A large chart or graph is, in general, more costly to produce than smaller size artwork and reproduction in the form of a transparency. The latter will stay in good condition longer. Large size photos, especially in color, are often prohibitive in cost. On the other hand small transparencies in color are relatively inexpensive.

When estimating the cost of visual materials there are several factors to consider. Floyd denoted: "To accurately estimate the cost of visual production it is necessary to take into consideration two factors. The first cost to be considered is the preparation of the master to be used in the actual production of the visual, which includes materials and labor (20, p. 24).

Eastman Kodak (21) has a publication to assist those who want to produce a slide presentation. The sections in the data book provide some ideas to help plan and produce an effective slide program. Some of the basic approaches for creating a slide presentation include:

1. Defining the objectives

2. Analysis of the audience

3. Planning a story board

4. Developing a script

5. Photographing the body of the presentation

6. Preparing the artwork and titles

7. Photographing the artwork and titles

8. Recording narration and background.

Jerrold Kemp (1, p. 36) listed a summary of the characteristics of slide series:

Advantages

1. Require only filming, with processing and mounting by film laboratory.

2. Result in colorful, realistic reproduction of original subjects.

3. Prepared with any 35-mm camera for most uses.

4. Easily revised and updated.

5. Easily handles, stored and rearranged for various uses.

6. Increased usefulness with magazine storage and automatic projection.

7. Can be combined with tape narration for greater effectiveness.

8. May be adapted to group or to individual use.

Limitations

1. Require some skill in photography.

2. Require special equipment for close-up photography and copying.

3. Can get out of sequence and be projected incorrectly if slides are handled individually.

The Title Slide

Of all the audiovisual aids to instruction available to the classroom instructor, color slides offer several unique advantages. Color slides are relatively easy to present in both group and individual instruction situations. To make a good set of homemade slides look truly professional, it is easy to add title slides. Title slides are not only useful for introducing the material, but also for dividing into sections and for making summaries. Titles can be important for practical as well as aesthetic reasons.

There are many different kinds of title slides. Probably the simplest way to obtain a title is to photograph "natural" signs--billboards, signposts, highway markers, nameplates on machinery, etc. If such titles do not meet the needs of the presentation, then titles can be made quick, easily and inexpensively. To make the title communicate exactly what is needed, the thing to do is write out the words and photograph them. If you cannot hand letter neatly, there are many alternatives: cut-out letters, press-on letters, the typewriter, three dimensional letters and mechanical lettering devices such as Wrico guides. Leroy lettering guides and Varitype machines are among the multitude of lettering devices (22).

Title and credit frames require some kind of typography. This information can be presented in a number of ways. In some instances it may be desirable to provide a color background to eliminate the "white effect." In others, the lettering can be converted to a Kodalith for a "burn-in" over a photography or artwork background. The route to take, of course, will depend upon the resources and budget available. A

time-saving technique is to prepare standard backgrounds that can be inserted under acetate overlays on which the images are painted. Of course it will be necessary to use paint that will adhere well to the plastic surface (23).

There are several factors that the instructor must take into consideration in regard to title slides according to Clymer (24) such as:

1. The copy must meet legibility standards--it must be easy to read when projected.

2. The title slides should be designed well and employ an appropriate type face for a professional appearance.

3. The titles should be produced at a fairly low cost without reducing quality control standards.

4. The entire production should not require an excessive amount of time, either in preparation of camera-ready copy or in the photo-graphic production of the title.

Philip Lewis made this comment referring to title slides:

Make certain that all type elements are sufficiently large for ease of readability when projected on a typical classroom-size projection screen (generally 50-60 inches in width). It is recommended that sans serif lettering be used for both upper and lower case and that adequate spacing be allowed between lettering and words (23, p. 21).

A sans-serif medium weight face of normal proportions is always a safe bet. For titles, short statements and labels, it is advisable to utilize the upper case only. When there is a great deal of text such as in complex tables, it is sometimes advantageous to set it in the upper and lower case. Line spacing is an important factor in legibility. If the lines are too close together, they will be hard to read. A good

starting point is a line spacing of one and one-half times the height of the letters for blocks of printed matter of more than one line (19).

Another caution to observe in making title slides is to allow at least a 10 percent safety margin from the edges of the frame to the type. This step will insure that any subsequent masking of the frame or the masking aperture in a projector will not cut off any of the type (23).

It is convenient and economical when originals from which pro-jected visuals are made adopt certain size standards. According to Eastman Kodak (25) these should be considered from several points of view:

1. Artwork that is too large encourages treatment too delicate for good intelligibility.

2. Artwork that is too small calls for extreme care in production.

3. The size delection should make it easy to attain the line weights and letter sizes needed to insure legibility.

4. It is convenient to store artwork in a standard letter file. This makes classification simple and provides good projection.

5. Film and paper in 8-by-10-inch size are common in photographic work, and it would be advantageous to adopt a size that would allow direct use of photographic images in this size.

6. The smallest symbol on the art-work size selected should permit easy lettering. In practice, this is one-eighth inch high.

CHAPTER III

METHODOLOGY

Type of Research

The investigation performed by the author was a library-descriptive research project designed to ascertain the various methods of producing title slides. The study was designed to experiment on selected techniques for producing title slides. After the literature was reviewed, five techniques were chosen under the following criteria:

1. The techniques are of a nature that a person with little photography background could produce good results.

2. The equipment needed for the techniques is minimal.

3. Some of the equipment can be produced by the person involved.

4. The time and processes are minimal.

5. The cost of materials are low.

Description of Experiment

The title slide techniques were reviewed and the five which follow met the criteria and were chosen for the study:

1. The Manipulation Technique - Placing lettering over or on an object or artwork, then photograph.

2. The Sandwich-Slide Technique - Having a previous scenic slide or artwork slide and a title slide, remove both from their mounts, tape together and remount.

3. The Kodalith-Film Technique - Dark lettering on white background is photographed with high contrast Kodalith Ortho film. The film is developed and mounted by the teacher.

4. The Double-Exposure Technique - A slide is taken of either a scene or artwork by cocking the camera without advancing the film and then photographing a title on the same frame.

5. The Slide-Duplicator Technique - Two previous shot slides, one of a scene or artwork and one of a title are photographed with a double-exposure.

The five techniques were experimented on in various manners to provide comparative data on the cost of materials, time, equipment, simplicity, needed facilities, and quality verses failure.

Treatment of Data

The information gathered through research and experimentation on the five selected techniques provided data for this study which will guide the instructor in using titling techniques. The results were recorded on tables which compare the techniques so the instructor can determine which techniques are more effective for a given situation to mediate instruction in industrial arts education.

CHAPTER IV

EXPERIMENTATION PROCEDURES

This chapter is divided into seven separate units. The first

describes different methods of lettering for title slides and includes

an example of each. The next five units describe in detail the se-

lected techniques for producing title slides. In conjunction with the

description, sample slides will be included as well as a cost analysis.

The seventh unit deals with the comparison of the selected techniques

to enable the instructor to implement the technique which is more adapt-

able in a given situation for mediating industrial arts education.

Lettering Methods for Titles

Titles generally require large and bold lettering. Since there

are relatively few major titles, their letters may be hand-drawn or set

individually in place by hand. But such methods may be too slow for

preparing captions that consist of many words; here other lettering

methods are appropriate, adequate, even better. The instructor needs

to know and select methods with regard to the results needed and the

time available for preparation of materials.

Some remarks follow concerning the five lettering methods along

with an example of each. Many more methods exist and still more will

be devised using new ideas and materials. No one method is necessarily

the best for any lettering job. The instructor needs to evaluate the

methods to meet the present situation in respect to availability, cost, ease of use, time required for preparation and resulting quality.

Typewriter Lettering

Lettering typed on a typewriter is good for captions requiring many words. It is advisable to use pica or boldface type; this is due to legibility of the projected type. Use paper of good quality, whether white or colored, and a carbon ribbon or a well-inked cloth ribbon. Have the type clean and strike the keys firmly and uniformly to get sharp, even, black impressions.

A sample of this lettering is shown in Figure 1.

TYPEWRITER

PICA

Fig. 1. Sample of Typewriter Lettering

Three-Dimensional Letters

Three dimensional letters are manufactured in cardboard, wood, cork, ceramics, and plastics and are available in plain back or pin backs. They are excellent for main titles and when photographed with side lighting, they give shadow effects and three-dimensional effects. Costs vary widely according to kind and size. Surfaces can be tinted

with paint or water colors. To place the letters position against a T-square or on a guide line and adhere temporarily with rubber cement.

A sample of this lettering is shown in Figure 2.

Fig. 2. Sample of Three-Dimensional Lettering

Cut-Out or Gummed-Back Letters

Cut-out or gummed-back letters are ready-to-use letters. Cut out of white or colored paper in many styles and sizes, these letters are easy to use for titles. They may be placed over any background. To align them neatly use a T-square or lightly rule a guide line on the mounting surface. The gummed-back letters are similar in effect, method, and use to cut-out letters except the manufacturer puts gummed backs on the letters.

A sample of this lettering is shown in Figure 3.

GUMMED-BACK LETTERS

Fig. 3.   Sample of Gummed-Back Lettering

Dry-Transfer Letters

These letters have sharp, clean edges, much like those printed from good type, and are easy to handle. They come in sheets of many sizes, styles, and colors. They are excellent for titles and labels on many types of background.

Dry-transfer letters are printed on the back of the sheet and each sheet is backed with a protective sheet of paper. Position the letters by aligning the printed line under the letters and over the guideline drawn. Burnish the entire letter with the round part of a pen or blunt object. Slowly lift the sheet of letters; the letter will remain transferred.

A sample of this lettering is shown in Figure 4.

DRY-TRANSFER

LETTERS

Fig. 4. Sample of Dry-Transfer Lettering

Felt Pen Lettering

Felt pen lettering can be achieved with either a beveled-edge
pen or sharp-tipped nylon pen. The beveled-edge pen makes a wide line
while the sharp-tipped nylon pen makes a fine line. They are easy to
use and are good for quick lettering on all surfaces.

A sample of this lettering is shown in Figure 5.

Felt Pen

Handwritten

Fig. 5. Sample of Felt Pen Lettering

The following five selected photographic techniques for producing title slides were chosen for this study using a predetermined criteria. Each technique is described and sample slides of the techniques are included to give the reader a better idea of the title slides that can result. Also, a cost analysis is listed for each technique which was established using retail store prices.

The Manipulation Technique

The making of a title slide using the manipulation technique involves organizing selected art work, lettering, etc., so it can be photographed. Felt-tip pens, in a variety of colors, can be used for simple lettering. If a more professional title is desired, three dimensional letters or transfer letters may be used. When the transfer letters are arranged on a clear sheet of acetate and placed over or in front of an appropriate background, such as colored paper, carpet tiles, or pictures, the titles may be shifted until they are positioned correctly. This way one picture can serve as the background for several different titles.

The Manipulation Technique does not involve elaborate camera equipment. Any camera with a close-up lens can be used, while utilizing the sun as the copy light, if copy light is not available. Any color slide film can be used for this technique. For this study High Speed Ektachrome (daylight) slide film ASA 160 was used.

After the background has been chosen, place the title directly on the background or on a clear sheet of acetate. The copy should be placed on the base of the copy stand with a piece of glare-free glass laid on the title and background to prevent any unwanted glare.

The camera is then fastened to the copy stand directly above the title and the appropriate ASA, f-stop setting, and shutter speed is made. The camera is adjusted to get the desired title and background in the viewing window, then is focused and the title is photographed.

The results of five different slides using the Manipulation Technique are presented in the Appendix.

Slide 1.1 was produced by adhering one-half inch, gothic, red gummed-back letters, "Industrial Arts Education," on an 8½-by-11-inch sheet of white paper. The projected image has sharp red letters with a solid white background.

Slide 1.2 was produced by adhering one-quarter inch, bold, black, dry transfer letters, "Electricity," on an 8½-by-11-inch sheet of white paper with a cartoon character drawn in black ink. The projected image has black images with a white background.

Slide 1.3 was produced by adhering one-half inch, gothic, white gummed-back letters, "Photography," on a sheet of acetate and positioned on a black background. The projected image has white "clear" letters with a dense black background.

Slide 1.4 was produced by adhering one-half inch, gothic, black gummed-back letters, "Basic Darkroom Procedure I," on a clear sheet of acetate, 8½-by-11 inches. The acetate was positioned on a red background. The projected image resulted in a red background with black letters.

Slide 1.5 was produced by adhering one-half inch, gothic, red gummed-back letters, "Energy and Power Technology," on a sheet of clear

acetate 8½-by-11 inches and positioning the acetate on a picture. The projected image has a black title with a picture for the background.

The following cost analysis shown in Table 1 was established by consulting retail stores.

TABLE 1

MANIPULATION TECHNIQUE--
COST ANALYSIS

Clear Acetate Sheet 8½-by-11	=	$ .20
Lettering/Title	=	.02
Slide Film/Title	=	.12
Processing/Title	=	.08
Total		$ .42

After selection of the background, the total time to make the title did not exceed fifteen minutes.

The Double-Exposure Technique

The Double-Exposure Technique requires more planning than the previous techniques. The instructor must take a double-exposure so more planning will be needed to locate the title properly on the background. This technique requires a camera with which the automatic double-exposure prevention mechanism can be overridden. This can be done on most 35-mm cameras by depressing the rewind release button, then pressing the film advance lever. Depressing the rewind release button disengages the film advance gears, enabling the film to remain stationary while the shutter is cocked.

After the picture is chosen for the background it is placed on the base of the copystand with a piece of glare-free glass on top. The camera is then connected to the copystand directly above the picture. The ASA, f-stop and shutter speed are set accordingly. The picture is photographed keeping in mind where the title is to be placed. The picture is then removed and the title is placed in the appropriate position with the glare-free glass on top. The lettering for this technique should be white (22). When following this procedure it is important not to advance the film. The film is tightened in the camera by turning the rewind lever. The rewind lever is held firmly, the rewind release button is pressed, and the advance lever is flipped one complete turn. The shutter is now cocked to be ready for the next exposure without advancing the film, enabling the next frame (title) to be superimposed over the previous (picture). Now the title slide can be photographed.

The results of three different slides using the Double-Exposure Technique are presented in the Appendix.

Slide 2.1 was produced by photographing a picture "Train" and on the same frame photographing the title "Transportation" which was made by adhering one-half inch, gothic, white gummed-back letters on an 8½-by-11-inch sheet of black paper. The projected image resulted with a train in the background and a white (clear) title.

Slide 2.2 was produced by photographing the cover of a photography book by Upton and on the same frame photographing the title "Photography" which was made by adhering one-half inch, gothic, white gummed-back letters on an 8½-by-11-inch sheet of black paper. The

projected image resulted with the book cover in the background and a white (clear) title.

Slide 2.3 was produced by photographing an outdoor scene and on the same frame photographing the title "Summer" which was made by adhering one-half inch, gothic, white gummed-back letters on an 8½-by-11-inch sheet of black paper.

The following cost analysis shown in Table 2 was established by consulting retail stores.

TABLE 2

DOUBLE-EXPOSURE TECHNIQUE--
COST ANALYSIS

Black Paper 8½-by-11	=	$ .02
Lettering/Title	=	.02
Slide Film/Title	=	.12
Slide Processing/Title	=	.08
Total		$ .24

The total time involved in photographing a title slide using this technique did not exceed fifteen minutes.

The Kodalith Film Technique

The Kodalith Film Technique involved the use of high contrast Kodalith Ortho Film, type 3. This film is available only through stores that handle Kodak graphic arts supplies. The 35-mm film (#6556) is sold only in 100 foot rolls (approximately $10.00/100 foot roll) and must be repackaged into cartridges by the user. Such repackaging can either be done with a bulk loader or in a darkroom.

A high contrast film is generally represented as one that registers blacks and whites but nothing in the grey scale. To make a title, type the word or phrase onto a piece of white paper and photograph it. To get "clean" lettering, use a typewriter with a carbon ribbon. Black transfer letters, black felt-tip pen, etc., on a white background will also work with fine results without investing too much money.

When the camera-ready copy is prepared, it is time to photograph the title. It will probably take a few test shots to determine the best results. Experimentation has determined that using four lights of 150 watts, placed approximately 45 degrees and the camera set with an ASA 6, f/4, and a shutter speed of one second will give good results. It is good precaution to use a release cable to eliminate the possibility of movement during the exposure.

Developing the Kodalith is a very simple process that can be done without a darkroom. The Kodalith film can be handled under red safelights (No. 1A) so this enables the teacher to make test shots, open the camera under red safelights and remove a portion of the film for development.

Kodalith can be developed in any of the following: Kodalith Super RT Developer, Kodalith Developer, Kodalith Fine-Line Developer or Kodalith Liquid Developer. To prolong their life, the developers are sold as two separate solutions, A and B, which are mixed in small quantities just prior to use (26).

To process the Kodalith film follow the table prepared by Eastman Kodak (27).

TABLE 3

KODALITH-FILM PROCESSING PROCEDURES

Process Solution	Time	Temperature
Kodalith Developer	2½ minutes	20°C (68°F)
Kodak Indicator Stop Bath or Kodak Stop Bath SB-1a	10 seconds	18.5 to 21°C (65 to 70°F)
Kodak Rapid Fixer*	20 seconds to 1 minute	18.5 to 21°C (65 to 70°F)
Kodak Hypo Clearing Agent	1 minute	18.5 to 21°C (65 to 70°F)
Water Wash	5 minutes	18.5 to 21°C (65 to 70°F)

*If the film is to be hand-colored, it must not be over-fixed or overhardened.

Most of the processing chemicals can be reused if stored in dark brown stopped bottles. The Developer has a short life once part A and B are mixed. The mixed solution should be discarded after a few hours. The Stop Bath, Fixer and Hypo Clearning Agent can be reused several times. The user should follow the instructions supplied with the chemicals.

Occasionally, slides prepared in this manner have pinholes or other imperfections in the black areas due to improper development or the presence of dirt somewhere in the process. These imperfections can be removed with negative opaque, available at photography stores. Opaque is simply a very dark paint which will block the passage of

light. It can be applied directly to the slide with a brush. This material, however, should be used only on a dry slide and as the last step before contact printing or mounting.

If a positive slide is desired (black art work or lettering on white background), the negatives can be contact printed. Lay the negative on a strip of roll film so the two emulsion sides of the film are facing each other. Place a piece of glass over the film and expose the film with a light source (enlarger) for a fraction of a second. Some testing may have to be done to receive good results. Now develop the film and mount the positive. With proper exposure, the result is a negative with white (clear) letters on a completely dense black background. Since the letters are clear, they can be colored with watercolors.

There are two good sources for watercolors. Food coloring, available at the grocery store, comes in four basic colors and can be diluted and combined to create almost any other color. The other source is synchromatic transparent watercolors, available throughout supply stores. This watercolor comes in a wide range of colors.

If a single color is to be added to a Kodalith slide, the best result will be obtained by dipping the dry piece of film into a tray of watercolors. If two or more colors are to be applied to the same slide, the use of a cotton swab is better than the tray method. The color will only show where the letters are located because of the density of the background. If certain words or parts of a diagram need to be emphasized, those words or parts can be colored, leaving the rest white (clear).

The results of slides prepared by the Kodalith-Film Technique are presented in the Appendix.

Slide 3.1 was produced by adhering one-half inch, gothic, black gummed-back letters, "Basic Darkroom Procedure, Part I," on an 8½-by-11-inch sheet of white paper. The projected image has a dense black background with white (clear) letters.

Slide 3.2 was produced by drawing a cartoon character and adhering dry-transfer letters "Electricity" on an 8½-by-11-inch sheet of white paper. The projected image has a dense black background. The letters and drawing were dyed two different colors to separate and make the letters more distinct.

Slide 3.3 was produced by typing "Basic Darkroom Procedure, Part II," on an 8½-by-11-inch sheet of white paper. The projected image has a dense black background with letters which were dyed multicolored.

Slide 3.4 was produced by making a contact print of slide number two. The projected image resulted with black letters and drawing and a white (clear) background.

Slide 3.5 was produced by making a contact print of slide number three. The projected image resulted with black letters and white (clear) background which was dyed to add color to the slide.

The time involved in preparing materials and photographing a title did not exceed fifteen minutes. The time to develop and mount a title did not exceed thirty minutes. The total time did not exceed forty-five minutes.

The following cost analysis shown in Table 4 was established by consulting retail stores.

TABLE 4

KODALITH-FILM TECHNIQUE--
COST ANALYSIS

White Paper	=	$ .02
Lettering	=	.02
Kodalith Film/Title	=	.02
Processing Chemicals/Title	=	.41
Slide Mounts/Title	=	.05
Total		$ .52

The Sandwich-Slide Technique

The Sandwich-Slide Technique is unique in that the background and the title are photographed separately. The two pieces of processed film are then "sandwiched" together in one slide mount.

When a background scene or artwork is chosen, the instructor has to keep in mind the location of the lettering. The background should have a light area which will allow for placement of the letters. First photograph the background with color slide film; then prepare lettering to correspond with the background slide.

The lettering should be black or a dark color on a light background. When the lettering is prepared, place it on the copystand to be photographed.

There are two methods to photograph the lettering. The instructor can use the same slide film or use a high contrast film (Kodalith Ortho Film).

When the Kodalith Ortho Film is used a negative (white lettering with a black background) results. The high contrast positive (black lettering with a white background) must be produced by contact printing the negative on a piece of Kodalith Ortho Film. Remove the two slides from their mounts, the background and title slide. Tape the slides together with small pieces of adhesive tape over the sprocket-hole edges. Then remount the taped slides in a new slide mount which can be purchased at photography supply stores.

The results of the three slides prepared by using Sandwich-Slide Technique are presented in the Appendix.

Slide 4.1 was produced by photographing the background and the lettering on two separate pieces of color slide film. The lettering "Energy and Power Technology" is one-half inch, gothic, black gummed-back letters adhered to an 8½-by-11-inch sheet of white paper. The projected slide resulted in a scenic background with black lettering.

Slide 4.2 was produced by photographing the background in color slide film and the lettering on Kodalith Ortho Film. The lettering "Transportation" is one-quarter inch, bold, black dry-transfer letters adhered to an 8½-by-11-inch sheet of white paper. The projected slide resulted in a scenic background with black lettering.

Slide 4.3 was produced by photographing the background on slide film and the lettering on Kodalith Ortho Film. The lettering, "Beginning Darkroom Procedure, Part II," is typed on an 8½-by-11-inch sheet of white paper using a pica typewriter with a carbon ribbon. The projected slide resulted in a scenic background with black lettering.

The following cost analysis shown in Table 5 was established by consulting retail stores.

TABLE 5

SANDWICH-SLIDE TECHNIQUE--
COST ANALYSIS

White Paper 8½-by-11	=	$ .02
Lettering/Title	=	.02
Two Frames Slide Film/Title	=	.24
Processing/Title	=	.16
Slide Mount/Title	=	.05
Total		$ .49*

*If Kodalith Ortho Film is used, add approximately $.33 per title.

The total time involved using color slide film did not exceed thirty minutes. If Kodalith Ortho Film was used, the total time did not exceed sixty minutes.

The Slide-Duplicator Technique

The Slide-Duplicator Technique involves combining a previous shot color slide and a high contrast title or color slide title in a double exposure. This technique combines ideas from both the Double-Exposure and the Sandwich-Slide Techniques. Some planning must be done when photographing both the original slide and the title so that the two integrate smoothly in the resulting title slide. After the instructor has the background and title slide prepared, the background slide is projected on a sheet of white paper and photographed with color slide film. After the background is exposed cock the advance lever

without advancing the film. This is done by tightening the film in
the camera by turning the rewind lever. The instructor should hold the
rewind lever firmly, press the rewind button and flip the advance lever
one complete turn.

If this procedure is followed, a good title slide will result.
Now, project the title slide onto the paper and adjust it to the ap-
propriate location. The lettering should be light colored so a black
lettered original is necessary. Adjust the f-stop setting one stop to
allow more light to enter the camera. This will expose the film for a
longer period of time and wash out the letters properly.

The results of three slides using the Slide-Duplicator Tech-
nique are presented in the Appendix.

Slide 5.1 was produced by using two previous shot slides. One
was a high contrast title slide, "Nature Study," and the second slide
was a sunrise slide used for the background. The projected image re-
sulted in a sunrise background with white (clear) lettering.

Slide 5.2 was produced by using a previous shot, high contrast
title slide "Photography" and the second slide used was a clear slide
colored with watercolors. The resulting slide, when projected, was a
multi-colored background with white (clear) lettering.

Slide 5.3 was produced by using two previous shot slides, both
the title "Energy and Power Technology" and the background were photo-
graphed using color slide film. The resulting slide when projected was
a scenic background with white (clear) lettering.

The following cost analysis shown in Table 6 was established by
consulting retail stores.

TABLE 6

SLIDE-DUPLICATOR TECHNIQUE--
COST ANALYSIS

Two Processed Slides	=	$ .40
Slide Film/Title	=	.12
Slide Processing/Title	=	.08
Total		$ .60*

*If a Kodalith Ortho Film Slide is used, add approximately $.30 per slide.

The total time involved with two previous slides available did not exceed fifteen minutes. If the instructor has to prepare the two slides, an added forty-five minutes should be added to the total time.

Analysis of Data Collected
Through Experimentation

To enable the instructor to choose which technique is more feasible for their use, a series of tables have been prepared to compare the five selected techniques.

The first of the comparative tables, Table 7, shows what equipment is needed for producing title slides using the selected techniques. On the table the areas marked N/A/N, not always necessary, indicate that the equipment corresponding to the techniques in these columns can be used; but if funding or availability prohibits their use, they are not necessary for production. The blank areas indicate that the corresponding equipment is not needed for the technique.

The data cited in Table 7 indicate that the Manipulation, Double-Exposure, and Sandwich-Slide Techniques would be more feasible for use

in a school where equipment or funding for equipment is not possible. Further study of Table 7 indicates that the Kodalith-Film and Slide-Duplicator techniques would require funding to acquire equipment for producing titles using these techniques.

TABLE 7

EQUIPMENT NEEDED FOR THE TECHNIQUES

Equipment	Techniques				
	Manipulation	Double-Exposure	Kodalith-Film	Sandwich Slide	Slide Duplicator
35-mm single-lens reflex camera	X		X	X	
35-mm single-lens reflex camera with double-exposure operation		X			X
Copystand or tripod	N/A/N	N/A/N	X	N/A/N	X
Close-up lens	N/A/N	N/A/N	X	N/A/N	X
Flash or Flood-lights	N/A/N	N/A/N	X	N/A/N	X
Cable release			X		
Slide duplicator					N/A/N
Slide projector					N/A/N
Developing tank and reel			N/A/N		

N/A/N--Not Always Necessary

The data cited in Table 8 shows the supplies needed to produce title slides using the five selected techniques. The blank areas in the table indicate supplies that are not needed for the corresponding techniques. The areas with N/A/N, not always necessary, indicate the supplies that can be used with the corresponding techniques, but are not needed to produce title slides.

Further study of Table 8 indicates that the Manipulation, Double-Exposure and Slide-Duplicator techniques use few supplies. The Kodalith-Film and Sandwich-Slide techniques require more supplies but are still in a price range comparable to the other three techniques. The table indicates that photographic chemicals are needed for the Kodalith-Film technique and not the others. This means that the instructor needs photographic chemicals to process the slides. The film for the four remaining techniques is sent to a professional laboratory for development.

The data cited in Table 9 compared the techniques for time, simplicity, needed photographic facilities and the quality of the final slide considering the failure rate. The column indicating time represents the time for preparing materials through to the actual projection. This, however, does not include processing time for film sent to a professional laboratory. The turn around time for laboratory processed film is approximately one week. Column 2, Simplicity, indicates the knowledge the instructor will need to use the corresponding techniques. Column 3, Facilities, indicates whether photographic darkroom facilities are needed when the corresponding techniques are persued. Column 3, Quality Considering Failure Rate, indicates the final results of the

title slides with consideration for the slides that do not result in projectable slides.

TABLE 8

SUPPLIES NEEDED FOR THE TECHNIQUES

Supplies	Techniques				
	Manipu-lation	Double-Exposure	Kodalith-Film	Sandwich Slide	Slide-Duplicator
Slide film	X	X		X	X
Kodalith (Ortho) film			X		
Photographic chemicals			X	N/A/N	N/A/N
Lettering materials	X	X	X	X	X
Background materials	N/A/N	X		X	X
Slide mounts			X	X	
Transparent dye			X	N/A/N	

N/A/N--Not Always Necessary

Further study of Table 9 reveals that overall the Manipulation technique would be most suitable for an instructor who wants good quality title slides in a hurry with little effort and little photographic knowledge. The Kodalith-Film and Sandwich-Slide techniques would also be quite suitable with good quality results, but require more time and photographic knowledge. Without proper equipment the

Double-Exposure and Slide-Duplicator techniques require more time and funds because of the wasted slides due to failure.

TABLE 9

TECHNIQUES COMPARED FOR TIME, SIMPLICITY,
FACILITIES AND QUALITY

| Techniques | Slide Production | | | |
	Time (1)	Simplicity (2)	Facilities (3)	Quality Considering Failure Rate (4)
Manipulation	Quick	Easy	None needed	Excellent
Double-Exposure	Quick, but more planning time	Photographic knowledge needed	None needed	Good-average
Kodalith-Film	More time needed, develop film yourself	Knowledge to develop and shoot Kodalith film	None needed, easier with darkroom or similar facilities	Excellent-good
Sandwich-Slide	Quick	Planning for placement of title	None needed	Excellent-good
Slide-Duplicator	Planning time	Photographic knowledge	None needed	Good-average

The data cited in Table 10 reveals the overall advantages and disadvantages of the five techniques for producing title slides. Column 1 lists the selected techniques for this study. Columns 2 and 3 indicate the major advantages and disadvantages that may help in determining which techniques should be used under a given situation.

TABLE 10

OVERALL ADVANTAGES AND DISADVANTAGES OF
THE FIVE TECHNIQUES

Technique (1)	Advantages (2)	Disadvantages (3)
Manipulation	Quick. Can preview the superimposition. No special equipment needed.	Normally sent to Lab. for development.
Double-Exposure	Quick. No special equipment needed.	Normally sent to Lab. for development. Cannot preview the superimposition. Must use light letters.
Kodalith-Film	Can photograph and develop without a darkroom.	Must use black letters on white background. More time and skill needed.
Sandwich-Slide	Quick. No special equipment needed.	Normally sent to Lab. for development. Original slide in sandwich. Dark letters on light background.
Slide-Duplicator	Can make some of the equipment.	Cannot preview the superimposition. Normally sent to Lab. for development. Requires more skill.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

Media "software" has become an integral part of the educational
process. Due to the vast quantity of new knowledge that is being dis-
covered, the educational process on all levels must take immediate
steps to condense and simplify knowledge.

Although there is little proof supporting the hypothesis that
media promotes retention, there is valid research to support the use of
media in the classroom. This support stems from reports that conclude
that media facilitates individualized instruction, speeds up the educa-
tional process and leaves the instructor more time to attend to indi-
vidual student needs.

This study was concerned with: (1) conducting a literature
search, (2) reviewing and analyzing techniques used in preparing title
slides for educational media, (3) identifying and selecting five tech-
niques to be used as the basis of the study by a predetermined criteria,[*]
(4) experimenting with the selected techniques used in producing title
slides, and (5) evaluating and comparing the selected techniques for

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[*]The five techniques are the Manipulation technique, the Double-
Exposure technique, the Kodalith-Film technique, the Sandwich-Slide
technique, and the Slide-Duplicator technique.

the purpose of recording those more adaptable in a given situation for mediating industrial arts education.

Conclusions

Instructor prepared title slides can upgrade the homemade slide presentation, and the two together can greatly enhance the present course content. Instructors should take a greater interest in the selection of slides with regard to local application and students needs.

Industrial literature put into slide form will take on new meaning. Materials unsuitable for classroom use, because of limited size, can become slides in a matter of minutes at a low cost. This will allow for greater use of materials in the long run because of saved space and money.

Instructors will continue to select course content and slides will continue in their role as supporting materials for lectures and demonstrations. However, if slides are purchased, they tend to become the core of the course; lectures and demonstrations will be made to fit around the commercially prepared materials.

Through experimentation it was noted that the Manipulation technique for producing title slides is very suitable where funding and equipment is very limited. The results obtained using this technique were excellent considering very little time and effort are needed. The Kodalith-Film and Sandwich-Slide techniques for producing title slides are acceptable where some funding is available to purchase supplies and equipment. The results obtained from these techniques were good to excellent but more planning time and photographic knowledge is required. The Double-Exposure and Slide-Duplicator techniques could be very

valuable if proper equipment is available. The equipment available for these techniques at the time of the study was limited which resulted in average to good title slides due to the many failures that occurred.

Since the techniques are low cost but result in good quality, the instructors could greatly improve their slide presentations. Also, the instructor and students would benefit by implementing one or more of these techniques.

Recommendations

It is the author's recommendation that the Manipulation Technique for producing title slides be used where funding and available time is very limited. The financial outlay for supplies and equipment is minimal and the final results are excellent.

It is also the author's recommendation that the Kodalith-Film and Sandwich-Slide Techniques for producing title slides be used where some funding is available to purchase supplies and some equipment. These techniques enable the instructor unlimited methods of producing title slides; the only limitation is the instructor's inventiveness.

The author does not recommend the use of the Double-Exposure Technique or the Slide-Duplication Technique. The failure rate with limited supplies and equipment for these techniques is high which results in a lose of time and money. The other three techniques are much more dependable. However, under special conditions with proper supplies and equipment these two techniques would be quite valuable.

The author recommends that the reader who wishes to pursue one or more of these techniques for producing title slides, use the Selected

Bibliography, also that the reader consider the equipment which can be made to reduce costs and improve the final results of a slide presentation.

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