THE APPLICATION AND EVALUATION OF A PILOT STUDY ON THE EFFECT OF A SELF-INSTRUCTIONAL UNIT CONCERNING BASIC DESIGN PRINCIPLES FOR SELECTED NON-ART MAJORS

Thesis for the Degree of Ph. D.

MICHIGAN STATE UNIVERSITY

WALTER D. YODER

1970

THESIS

This is to certify that the

thesis entitled

THE APPLICATION AND EVALUATION OF A PILOT STUDY OF A SELF-INSTRUCTIONAL UNIT CONCERNING BASIC DESIGN PRINCIPLES FOR NON-ART MAJORS

presented by

Walter D. Yoder

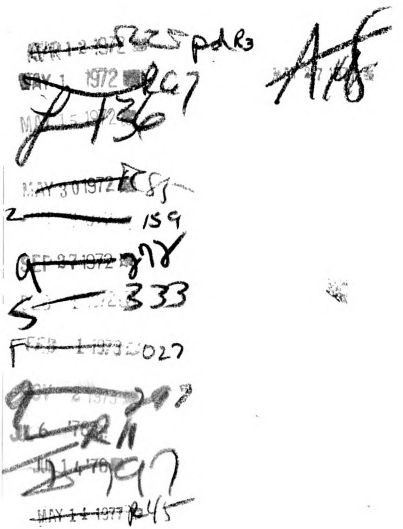
has been accepted towards fulfillment
of the requirements for

Ph.D. degree in Education

James L. Page
Major professor

Date 10/30/70

O-7639



THE APPLICATION AND EVALUATION OF A PILOT STUDY ON THE EFFECT OF A SELF-INSTRUCTIONAL UNIT CONCERNING BASIC DESIGN PRINCIPLES FOR SELECTED NON-ART MAJORS

By

Walter D. Yoder

The purpose of this pilot study was to test and evaluate an auto-tutorial sequence on the basic principles of design. A carrel learning environment was designed using a Carousel projector, color-slides, tape deck, audio-tape, and projection screen. Twenty-five design principles were viewed by fifty participants. A comprehensive review booklet was used during the program and the students were allowed to retain this booklet for further study.

A standard lecture presentation on the basic principles of design was given to fifty additional students. These participants were also allowed to retain the review booklet.

The major source of data in the study was collected as a result of four evaluations.

1. An attitudinal questionnaire was completed by the fifty participants in the experimental group after completing the auto-tutorial segment.

2. A post-test was administered to both the experimental and control groups three days after the experiment. An analysis of the post-test scores for a statistical significant difference between two groups was executed.

3. Seventeen variables were developed out of a personal inventory completed by both the experimental and control groups. A correlation analysis of these variables was examined.

4. A comparative analysis of the final grades of all one hundred participants was made at the end of the term of study.

The results of these four evaluations were:

1. The basic attitude of the fifty participants in the experiment was excellent. There was general agreement that the program was enjoyable and an effective method of teaching basic design principles. The majority of students also agreed that they preferred the auto-tutorial method to the standard lecture system and the program was a basic structural improvement to the course, Textiles and Related Arts, offered by the Department of Home Economics.

2. The experimental group performed at a higher level than the control group on the post-test. The statistical null hypothesis of the study was rejected. The experimental group performed at a higher level on the T test for significant difference between two equal groups.

3. After the seventeen variables were statistically correlated only eleven pairs of variables correlated above $\pm$ .03. These moderate correlations demonstrated that:

Those participants who took part in the experiment demonstrated favorable reaction to it. More time was taken by the control group to complete the exercise. The control group utilized 40 minutes, the experimental group averaged only 35 minutes. Further correlations occurred in the areas of Major Related to the Arts and, TRA being a Core or Elective Course, Major Related to the Arts and Professional Career Choice, Major Related to the Arts and Academic Interests in the Arts, Time Taken on the Experiment and Reaction to the Experiment, Academic Interests Related to the Arts and Professional Career Choice, Academic Interests and Prior Knowledge of Design, Secondary Interests in the Arts and Professional Career Choice, and Professional Career Choice and Prior Knowledge of Design.

4. A final grade analysis was examined at the termination of the course and the experimental group

demonstrated a slightly higher final grade average than the control group.

Conclusions of the pilot study isolate several important factors. Programs such as the one used in the pilot study are possible future contributions to instructional problems in overcrowded classes. Attitude toward course material in the area of art education can be improved by the use of the auto-tutorial system and time can be better utilized.

THE APPLICATION AND EVALUATION OF A PILOT STUDY ON THE EFFECT OF A SELF-INSTRUCTIONAL UNIT CONCERNING BASIC DESIGN PRINCIPLES FOR SELECTED NON-ART MAJORS

By

Walter D. Yoder

A THESIS

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

College of Education

1970

ACKNOWLEDGMENTS

The composition and completion of this pilot study was made possible by many people. The writer's advisor, Dr. James L. Page, offered exceptional guidance, encouragement, and patience. Mrs. Lyndon Preston, Miss Marguerite Grabow and Miss Jayne Kostal were very helpful in typing and editing this study.

A special thanks is extended to Mrs. Bonnie Morrison for giving the writer the opportunity to apply the instrument to her class, Textiles and Related Arts, given in the College of Home Economics.

Mr. David Logan, Professor of Art Education, offered important assistance in the area of critique and analysis of the instrument along with encouragement to proceed with the study.

A very special thanks goes to the writer's wife, Bonnie J., for her years of patience and encouragement.

Gratitude also must be given to the advisory members of the writer's committee, Dr. William Sweetland and Dr. Troy Stearns, for their critical evaluations. The moral support and financial aid given to the writer over the years by his family is greatly appreciated.

TABLE OF CONTENTS

Chapter		Page
I.	INTRODUCTION	1
	Statement of the Problem	1
	Purpose of the Study	2
	The Question for Study	3
	Assumptions of the Study	4
	Limitations of the Study	5
	Definition of Terms	6
	Methods and Procedures Used in the Study	7
	Description of the Pilot Test Instrument	9
	Importance of the Study	10
	Organization of the Study	12
II.	A SURVEY OF THE LITERATURE AND RESEARCH	14
	Introduction	14
	The Relative Newness of the Auto-Tutorial System in Art Education	14
	The Relationships Between the Cognitive and Affective Domains	16
	The Need to Establish Behavioral Objectives in Art Education	20
	Some Important Research Trends in Art Education	24
	Some Possible Rules for the Program Planner in Art Education	27
	Summary	33
III.	CONDUCT OF THE STUDY	34
	Summary	39
IV.	ANALYSIS OF THE DATA CONCERNED WITH THE PILOT STUDY	41
	Results of the Attitudinal Questionnaire	42
	Results of the Post-Test	43
	Results of the T Test Analysis of Significant Difference	43
	Results of a Correlation of Seventeen Variables	44
	Results of the Final Grade Analysis	49
	Summary	50

Chapter		Page
V.	SUMMARY AND DISCUSSION	51
	I. SUMMARY OF THE PILOT STUDY	51
	II. CONCLUSIONS	55
	Implications of the Pilot Study for the Field of Art Education	55
	III. RECOMMENDATIONS	60
BIBLIOGRAPHY		61
APPENDICES		70

LIST OF TABLES

Table		Page
1.	Results of the Attitudinal Questionnaire	42
2.	Post-Test Analysis Scores	43
3.	Analysis of Variance on Post-Test Scores	43
4.	Variables Used in the Correlation	44
5.	Correlation Results of the Seventeen Variables	45
6.	Final Grade Analysis of the Control and Experimental Groups	49

LIST OF APPENDICES

Appendices		Page
A	Pilot Study Instrument	70
B	Designs Used in the Study.	123
C	Script for Decisions in Design	126
D	Post-Test Used in the Pilot Study.	132
E	Personal Inventory Questionnaire	140
F	Attitudinal Questionnaire.	143
G	Pilot Study Time Table	144

CHAPTER I

INTRODUCTION

Statement of the Problem

> The arts are the language of the imagination and the emotions. Their language is essentially intuitive and must be treated and used as such. Because it is intuitive it can keep alive and mature the imagination and emotions and so maintain a proper balance in the mind. Such a balance is essential not only to the growth of personality of the adult, but also to society and civilization.[1]

The twentieth century abounds with problems which deal with the communications process. Such a technology has developed out of this ever-expanding medium to meet the needs of the classroom teacher. The exploding student population has placed stress on old systems, methods and approaches. This study is designed to investigate the possibility and potential of a self-instructional program which deals with twenty-five selected design principles as seen and developed by practicing art teachers.

It is most difficult for art teachers to develop a working vocabulary in design without having to spend several class sessions explaining and demonstrating these special definitions. Can media technology aid the classroom art teacher

---

[1]A. Barclay Russel, "The Relation of the Arts to Education and Society," Art Education Today (1951-1952), page 17.

in effective ways which allow more time for student manipulation and discussion of basic design principles?

Purpose of the Study

Students now, because of media in the home and school, bring more to the learning process than did pupils of the past. The purpose of this study is to establish whether a self-instructional program sequence on basic design elements can perform the task of instruction more effectively than the more static, passive, lecture method. Some immediate advantages can be gained. Enrichment experiences can be substituted in lieu of the standard lecture. Students can then proceed with the subject matter at their own rate and have ample opportunity for review of material not fully understood on first exposure. "Approximately 85 percent of learning is through the visual sense."[2] The implications of this finding are, indeed, far reaching, considering the impact of television, motion pictures, and all other visual means of learning found in our twentieth century culture. It seems, then, important that there be improved means of translating methods for critical visual analysis. The self-instruction program in question is one possible way of testing a more efficient method. Dr. S. J. Hayakawa, President of San Francisco State College, in referring to past educational methods recently stated that

---

[2]Leonard C. Silvern, Textbook in Methods of Instruction (2nd ed., Los Angeles: Hughes Aircraft Co., 1962), p. 44.

"...the old-fashioned lecture system revered since the middle ages is probably out of date."[3] The graphic arts are man's creative efforts to cope with and understand his environment. It, therefore, follows that it is necessary to develop and test a highly visual system to present this material in a system or structure that will increase the probability that learning will occur in an orderly and efficient way.

The Question for Study

The question for study is: "Can a self-instructional program on the elements of design transfer a given number of twenty-five basic concepts into the working vocabulary of non-art majors taking the introductory course, Textiles and Related Arts, in the College of Home Economics?" Subject matter in the course deals with the elements of art, systems of color, and historical periods of art. Students are required to take the course as a prerequisite to more specific skill courses such as dress design, fabric design and interior decorating. The very nature of this approach requires that enrichment experiences be included in the introductory course. Basic visual experiences that tie together the multiple use of these basic principles are needed.

These basic visual experiences should possess the quality of an integrated whole. "A system is the structure or organization of an orderly whole, clearly showing the interrelationships of the parts to each other and to the whole itself."[4]

---

[3]S. J. Hayakawa, San Francisco Examiner (Feb. 3, 1969), p. 6.

[4]H. A. Bern, et. al. "Reply to Questions About Systems," Audio-Visual Instruction. Vol. 10 (May, 1965), p. 367.

A second question, then, is developed in the course of this investigation: Can time be saved by the use of the auto-tutorial method so that more effective enrichment experiences can be included during regular class hours?

Assumptions of the Study

A number of basic assumptions have been made which arise from the author's experience. Discussions and interviews held with various academic departments which have tested self-instructional programs in their subject areas have helped in developing these initial assumptions.

Four basic assumptions seem to crystalize out of the complexity of the study:

(1) That there will be no significant difference in information transferred to the control group and the experimental group. If a difference should occur, it is assumed that the experimental group, hopefully, will gather in slightly more information than the control group. (2) It is assumed that less time will be spent by the experimental group in the learning situation than the control group with which the standard lecture system will be used. (3) The carrel students (experimental group) will have a higher final grade tabulation than the control group. (4) The general attitude of the experimental group will be markedly more positive about the elements of design than the control group which experiences the standard lecture system.

Limitations of the Study

There are a number of limitations which arise out of a close examination of this pilot study. One is the diverse background of both the control and experimental groups. Using fifty persons in each group tends to keep this type of contamination to a minimum. Using twice this number of students would be better, but the statistical research done in the past indicates that fifty students in each group will be satisfactory for a pilot study of this nature. Secondly, the interest level of all participants will be somewhat varied. The basic principles of design may not be approached with equal amounts of enthusiasm on the part of all participants. Thirdly, the retention time will not be exactly the same for the experimental group. Six programs will be used in the carrels for the fifty participants, which means very careful scheduling. This will cause a few hours difference in retention time. The limitation is minimized, however, as each student will be given a booklet which duplicates the visual part of the program. The ensuing review by all students involved will tend to equalize the problem of non-equal retention time. Fourthly, the "Hawthorn effect" will be in operation.

Great effort will be made to keep the output material the same in all areas, hopefully, to negate the contaminating influence of the "Hawthorn effect." Lastly, the conclusions drawn from this pilot study will be approximate. Generalization will be appropriate, but only a series of such studies would develop a bulk of statistical data which would move the general conclusions into the arena of statistical definitiveness.

Definition of Terms

The following list of definitions will aid the reader in more fully understanding the materials used in this pilot study investigation:

1. Pilot Study: "A preliminary study, conducted with a small group (100 persons) used to try out techniques, methods, procedures, and an instrument."[5]
2. Systems Approach: "An effort to organize and condense those necessary or desired experiences as concisely and systematically as possible so as to increase the probability that learning will occur in an efficient manner."[6]
3. Design: To manipulate or organize the basic elements of art, line, color, texture, value and shape into a given two-dimensional product.
4. Instrument: A group of twenty-five basic design principles graphically demonstrated in both a slide-tape presentation and in booklet form designed specifically for this study.
5. Hawthorn Effect: A student or students reaction to a given presentation in the areas of excitement, poignancy of the moment and positive-negative effects on the experimental procedures used in this study.
6. Auto-tutorial System: An arrangement of devices

---

[5]Carter V. Good, ed., Dictionary of Education (New York: McGraw-Hill, 1959), p. 532.

[6]Donald K. Stewart, "A Learning Systems Concept as Applied to Courses in Educational Training." (Unpublished paper. Articulated Instructional Media Program, University of Wisconsin, Madison, 1964) p. 7.

and materials which allow the student to study any given material by himself.

7. Mode: A given manner of graphically portraying an idea, or a group of ideas.
8. Bleeding: The art of extending a graphic idea to the edge of a given surface or format.
9. Gradation: To graphically portray an idea slowly from one area to another; such as light to dark, thick to thin.
10. Alternation: To physically move from one idea to another quickly, such as: light, dark--light, dark, etc.
11. Occult Balance: An arrangement of basic design principles which visually seem to be in balance.
12. Non-objective: A design in which the elements of art become the subject matter.
13. Control Group: A group of fifty students who receive information in the standard lecture system.
14. Experimental Group: A group of fifty students who receive the information in an auto-tutorial or self-instructional manner.
15. Design Principle: A simple graphic manipulation concept, such as a bleeding element, an abstract mode, a horizontal line, etc.

Methods and Procedures Used

The author brings to this experience eight years of teaching art at the college level. During these initial years of

experience, the writer developed certain unique procedures and methods of instruction in the area of basic design. These procedures and methods were used over many working periods and, although no formal evaluations were made, student response was favorable. Positive feedback was also received after some of the students had transferred to other colleges and universities; this was mostly in the area of a student's reflection on his command and use of basic design principles. These reactions, along with additional and new knowledge, acquired by the author himself, prompted this in-depth experiment and report.

When one reviews the total departmentalization of an institution as large as Michigan State University, one finds several areas in which basic design is a necessary prerequisite to advanced courses within a particular study area. Fortunately for the author, the College of Home Economics is taking an in-depth look at possibilities of changing instructional patterns in the application of design as it pertains to its established beginning courses of study. Textiles and Related Arts 140 is one of these courses. The instructor, after a number of interviews, agreed to apply this instrument, and was most interested in the outcome of this pilot study. Should this pilot study prove to be a success, other slide-tape presentations covering other elements of the course will be developed.

After a period of course-matter adjustment (about four weeks), the instrument was given to two groups. Fifty persons were selected, through use of the random sample

process, to take the basic instrument in an auto-tutorial environment; and another fifty persons, selected by the same process, received the instrument material via the standard lecture system.

Care was taken to keep the retention time as equal as possible. This entire activity took place over a period of one week.

There were four evaluation procedures: (1) post-test scores were compared and evaluated statistically by the T test method for significant difference between two equal groups, (2) a study of final-grade comparisons were made at the end of the term, (3) a background questionnaire was examined to determine what past experiences each of the 100 students was brought into the experiment, and (4) an analysis of time taken and student attitude was made.

Basic Description of the Pilot Test Instrument

A selection of twenty-five basic design principles have been selected for this treatment. Some thirty texts on basic design were reviewed to establish the commonality and importance of each design principle.

The basic construction of the instrument was highly visual. Graphic samples were given for each basic principle and the element of art. Line, color, texture, pattern, value and shape were described and visually portrayed for each of the twenty-five design principles. The technique of repetition was freely used to reinforce each group of concepts. Interrelationships of the entire instrument were established by accompanying audio-tape. It was expected that most students

would take about thirty minutes to complete this program. The lecture given to the control group was 40 minutes in length, covering the same material.

The post-test was a combination of carefully constructed true-false and multiple-choice questions. A total of twenty-five items of each type was used. Students responded to a projected color slide with a thirty second limit for each item. This test was given to both groups simultaneously in the same room.

Importance of the Study

The importance of this pilot study is found in three areas of concern:

1. The problem of large enrollments with crowded classes.
2. The student's need for practical laboratory experiences.
3. The general need for more awareness of design in living on the part of the whole society.

1. The problem of large enrollments with crowded classes: College and university enrollments continue to rise. Can instruction for these increased numbers be improved, enriched, and made more relevant? This study attempts to investigate the possibilities. It is sometimes said that "teaching is an art." This may be true; however, "education" should also be a "science," and the scientific method demands that we begin with a definition of the problem. In education,

this is simply stated, "learning must be done by the learner."[7] The instrument being used to facilitate this in this study is an in-depth attempt to organize matter in one area of instructional objectives and effective evaluation.

2. The student's need for practical laboratory experiences: To more fully understand the basic principles of design, time should be set aside for manipulation experiences. This experiment, hopefully, will develop possibilities for better time utilization. A saving of lecture time will free the instructor to plan opportunities which will allow the student to create items in or out of class to demonstrate his understanding of the course material.

3. The general need for more awareness of design in living on the part of the whole society: Two reasons for the growing interest in art are the extension of leisure time and the increase in the number of people whose work does not give them a sense of personal reward because they do only part of a job. One need of people in a mass society is to be able to find self-identification through meaningful independent work. To develop this capacity, schools need to give pupils opportunities to develop talents and skills in activities that contribute to their self-development. The ability to organize and express ideas in art can give some people a strong sense of self-identification and achievement.[8]

---

[7]Samuel N. Postlethiwait, "Teaching Tools and Techniques, An Audio-Tutorial Approach to Teaching," Pacific Speech (Vol. 1, No. 4, 1967), p. 57.

[8]June King McKee, Preparation for Art (San Francisco: Wadsworth Publishing Co., Inc., 1961), p. 171.

This pilot study attempts to demonstrate potential systems in which topics about art and design can be organized and presented with effective control of instructional objectives in order to better prepare the non-art major in the principles of design. Should this be the case, the students involved will be more fully prepared to enter the non-art world with effective means to creatively design their leisure time and business responsibilities.

Organization of the Study

Chapter I has defined the purpose of the study--to apply and test an instrument on the basic principles of design for non-art majors. This chapter has also defined terminology and set forth limitations of the study. It has presented an overview of the procedures and design of the pilot study.

Chapter II reviews the professional literature in the areas of self-instructional programs, the relationship between the cognitive and the affective domains, behavioral objectives in art education, and some possible rules for the program planner in art education.

Chapter III covers, in detail, the procedures employed in the development, application and testing of the instrument.

Chapter IV presents an analysis of the data concerned with the study.

Chapter V includes a summary of the study, some conclusions drawn from the study, as well as suggestions for

possible future development and methods for programming information in the area of art education.

CHAPTER II

A SURVEY OF THE LITERATURE AND RESEARCH

Introduction

The purpose of this chapter is to briefly discuss selected research and literature which demonstrates the relative newness of auto-tutorial programming in art education. The relationship of the cognitive and affective domains is discussed; and the need to establish meaningful and relevant behavioral objectives in the field of art education is explored. The examination of some important historical-research trends in art education is cited and the chapter is concluded with some possible rules for the program planner in art education.

The Relative Newness of the Auto-Tutorial System in Art Education

A careful review of available literature on art education methods and procedures does not cover the need to apply a behavioral objective approach to the teaching of art methods and practice. Most texts, workbooks, and articles are oriented toward information concerned with art techniques, project ideas, appreciation of art, art history and basic art education methodology.

The advantage of mediated learning of any type was not fully recognized by most educators until the military found it essential to train the millions of recruits during the second World War. Since that time, the military and industry have had success in training large numbers of people with special programs. These programs usually contain material which deals with special tasks and behaviors which are needed by the learner to perform a given billet. James D. Finn,[9] in an article written in 1956, deals with the concept of "Instructional Systems" as employed in industry. Relevant educational literature on systems and the auto-tutorial approach are not abundant prior to Dr. Finn's article.

Research also reveals many descriptive titles for this relatively new approach to learning. John Kassay[10] lists several: (1) mediated instructional systems, (2) individual instructional systems, (3) poly-sensory instructional systems, (4) packaged education, and (5) orchestrated learning.

The newness of this systems approach to learning is also evidenced by the fact that not until 1965 had the Education Index begun listing programs involving the auto-tutorial approach to education.

---

[9]James D. Finn, "Audio-Visual Development and the Concept of Systems," Teaching Tools III (Fall, 1956), p. 163.

[10]John Kassay, "Self-Instructional Systems," Audio-Visual Instruction (April 1966), 35.

The Relationship Between the Cognitive and Affective Domains

The bulk of the research in education which deals with learning patterns is divided into three basic areas: motor skills, cognitive skills, and the affective domain. The research dealing with program development in newer media utilization has been in the areas of motor skills and cognitive learning. Art education, because of its dominant interest in the creative capacities of the learner, has not as yet offered a rich resource in studies dealing with the applications of self-instructional programs. The systems approach to learning in art education, in behavioral terms, is well articulated by June McFee:

> The general trend in elementary art education today is to recognize individual differences in motivation and the kinds of tasks children are capable of, realizing that education has the function of helping children prepare themselves to contribute to, and live in, a complex society.[11]

This threshold situation involving the affective domain and the systems approach can also be noted in Krathwohl, et. al., Taxonomy of Educational Objectives.

> A second part of the taxonomy is the affective domain. It includes objectives which describe changes in interest, attitudes, and values, and the development of appreciations and adequate adjustment. Much of our meeting time has been devoted to attempts at classifying objectives under this domain. It has been a difficult task which is still far from complete. Several problems make it so difficult. Objectives in this domain are not stated very precisely; and, in fact, teachers do not appear to be very clear about the learning

---

[11]McFee, op. cit., p. 180.

> experiences which are appropriate to these objectives. It is difficult to describe the behaviors appropriate to these objectives since the internal or covert feelings and emotions are as significant for this domain as are the overt behavioral manifestations. Then, too, our testing procedures for the affective domain are still in the most primitive stages. We hope to complete the task but are not able to predict a publication date.[12]

Most of the important research in art to date has been in the area of the cognitive domain. In Taxonomy of Educational Objectives, Krathwohl defines the cognitive domain as:

> The cognitive domain, which is the concern of this Handbook, includes those objectives which deal with the recall or recognition of knowledge and the development of intellectual abilities and skills. This is the domain which is most central to the work of much current test development. It is the domain in which most of the work in curriculum development has taken place and where the clearest definitions of objectives are to be found phrased as descriptions of student behavior. For these reasons, we started our work here, and this is the first of our work here, and this is the first of our work to be published.[13]

Many important studies in various areas of art, such as pictures versus words, color, pictorial perception and pictorial quality, have been conducted by May,[14] Lumsdaine,[15]

---

[12]David R. Krathwohl, Benjamin S. Bloom, Bertram B. Masia, Taxonomy of Educational Objectives, The Classification of Educational Goals, Handbook I: Cognitive Domain, (New York: David McKay Co., Inc., 1963) p. 7.

[13]Ibid., p. 7.

[14]M. A. May, "The Psychology of Learning from Demonstration Films," Journal of Educational Psychology (1946), No. 37, 1-12.

[15]A. A. Lumsdaine, "Graphic Aids, Models, and Mockups as Tools for Individual and Classroom Instruction; Educational Media: A Symposium," National Resources Council Publication No. 789 (Washington, D.C.: National Academy of Sciences, 1960), pp. 69-113.

Zuckerman,[16] Aukes,[17] Vernon[18] and others. These studies, done mostly in the military recruit-training programs, tested only cognitive responses such as information retention, color and the learning process, which type of visual teaches best, and visual perception skills.

The relationship between the cognitive and affective domains are very closely inter-related. Krathwohl comments on this inter-relationship.

> We recognize that human behavior can rarely be neatly compartmentalized in terms of cognition and affect. It is easier to divide educational objectives and intended behavior into these domains. However, even the separation of objectives into these two groups is somewhat artificial in that no teacher or curriculum worker really intends one entirely without the other.[19]

The scope of the affective domain is immense and complicated. Krathwohl explains:

> The affective domain is, in retrospect, a virtual Pandora's Box. One finds in it the objectives which were stated confidently at one time and then allowed to disappear from view. One finds in it the objectives on which disagreement is most likely within the school. One finds in it the vital points on which the society itself may be in disagreement.

---

[16]J. V. Ziekerman, "Predicting Film Learning by Prerelease Testing," AV Communications Review (1954), 49-56.

[17]T. E. Aukes, G. B. Simon, "The Relative Effectiveness of an Air Force Training Device Used Intact vs. with Isolated Parts," Research Report AFPTRC-TN-56-77 (ASTIA Doc. No. 131429) (Lackland Air Force Base, Texas, Air Force Personnel and Training Research Center, June 1957).

[18]M. D. Vernon, A Further Study of Visual Perception (London: Cambridge University Press, 1952),

[19]David R. Krathwohl, Benjamin S. Bloom, and Bertram B. Masia, Taxonomy of Educational Objectives: The Classification of Educational Goals, Handbook II: Affective Domain (New York: David McKay Company, Inc., 1964), p. 85.

> Much of the affective domain has been repressed, denied, and obscured. It is as though we have come upon the unconscious and begun to examine its contents. We are not entirely sure that opening our 'box' is necessarily a good thing; we are certain that it is not likely to be a source of peace and harmony among the members of a school staff.
>
> Some would question the desirability of a school's considering affective objectives. Some would wonder about the wisdom of making these objectives explicit rather than implicit, and more would doubt the possibility of the school's doing anything significant to develop affective objectives. If we obscure the objectives in the affective domain and bury them in platitudes, how can we examine them, determine their meaning, or do anything constructive about them? Our 'box' must be opened if we are to face reality and take action.
>
> It is in this 'box' that the most influential controls are to be found. The affective domain contains the forces that determine the nature of an individual's life and ultimately the life of an entire people. To keep the 'box' closed is to deny the existence of the powerful motivational forces that shape the life of each of us. To look the other way is to avoid coming to terms with the real. Education is not the rote memorization of meaningless material to be regurgitated on an examination paper. Perhaps the two Taxonomy structures may help us to see the awesome possibilities of the relations between students-ideas-teachers.[20]

Research which demonstrates the strong relationship between the cognitive and affective domains has been conducted by Johnson,[21] Russell,[22] Thistlethwaite[23] and Wertheimer.[24]

---

[20]Ibid., p. 91.

[21]Donald M. Johnson, The Psychology of Thought and Judgment (New York: Harper and Rowe, 1955),

[22]David H. Russel, Children's Thinking (Boston: Ginn & Co., 1956),

[23]Donald Thistlethwaite, "Attitudes and Structure as Factors in the Distortion of Reading," Journal of Abnormal and Social Psychology, 45 (1950), pp. 442-458.

[24]Max Wetheimer, Productive Thinking (New York: Harper and Rowe, 1954),

The Need to Establish Behavioral Objectives in Art Education

Disciplined research on the teaching of art is a relatively new field of study. Jerome Hausman states:

> The field of art education, as we know it today, is a relatively new development. There is, for example, a much greater tradition for the artist-apprentice relationship. Indeed, some writers deny that a 'field of art education' should exist and insist that true artistic insight cannot be 'taught' by persons trained 'to teach.' Their point of view is that only through continuous and intensive contact with the artist himself can a person realize the deep and rich significance of art.[25]

William R. Hazard examines the role of the art teacher and his daily responsibilities.

> Art teachers' daily contact with the smorgasbord issues of behavioral responses, visual stimuli-response efforts, art materials, and processes tend to give an impression that their professional life is too much a blur, too much a morass of fragmented experiences, and all too frequently a limited sense of directed, purposeful activity. It is one thing to reflect profoundly on the problems of art and education in the quiet moments of our life and quite another to meet the daily challenge of directing a class of 25 to 30 very active, very unstructured, very complicated youngsters for five to six hours each day. The reflection may lead us to rejoice in the contemplative facet of our task and to even believe, momentarily at least, that the warm glow of reasoned concern prevails in our profession. The warm glow of reason, however, may be jarred by the realities we face in guiding pupils in the ever-emerging, never fully realized quest for meaning through art experience.[26]

---

[25]Jerome Hausman, "Research on Teaching the Visual Art," Handbook of Research on Teaching, American Educational Research Association, ed. M. L. Gage (Chicago: Rand McNally and Co., 1963), p. 1101.

[26]William R. Hazard, "Goals," Art Education, Journal of the National Art Education Association, Vol. 20, No. 8 (Nov. 1967), p. 18.

The need to establish broad behavioral objectives is important as art education does in fact exist throughout our lives. The schools, museums, community centers, colleges, professional schools, and adult training programs abound with many types of art education activities.

Logan states there is a great need for projection and evaluation of art education in the areas of:

1. General Education in the arts in public schools and colleges.
2. Art Education available to students who intend to practice and teach the arts.
3. The social influences of art brought about by museums, galleries, public schools, and patronage.[27]

The importance of art education in the lives of our ever-expanding student population is firmly established. An overview of school programs shows art education is being utilized at all levels of curriculum planning to make the learning experiences of our youth as rich and rewarding as possible.

June McFee explains the difficulty of planning objectives in art education:

> In a democratic society the objectives of education theoretically evolve from the ideals and needs of the people. Ideals and needs vary from one community to another and change with time. School administrations and state and local governments often establish objectives in terms of their interpretations of the community's ideals and needs. Differences in interpretation, inadequate measurements, and changing values make the job of establishing objectives difficult in a complex society. School administrators, consultants, and teachers should have broad professional training to help them to evaluate community needs.[28]

---

[27]F. M. Logan, Growth in Art in American Schools (New York: Harper and Rowe, 1955), p. 31.

[28]McFee, op. cit., p. 169.

McFee comments on some possible areas in which the art educator should look for meaningful objectives for art program planning.

> One source of our objectives is our democratic society itself and the kind of citizenry needed to uphold it. To identify the objectives, we need to study our culture, our form of government, and the basic assumptions and ideals of our social organization. The second source is our own personal or subgroup philosophy. We have varying conceptions about the nature of man and the universe, what man's purpose should be, and how his potential should be developed. Our third source of objectives is our pupils, as we understand them from the viewpoints of professional education, psychology, sociology, and anthropology. This understanding will help us to allow for individual differences in the learning process. Our fourth source is the contribution of civilization's accumulated knowledge and expressions--the sciences, the arts, the humanities. In teaching art, our question is, 'What can the rich heritage of the arts contribute to the training of children?'[29]

The following list of objectives are suggested by McFee as a broad important beginning to determining behavioral objectives in art education:

> A capacity for aesthetic experience in work and play. Skills to express these experiences. An appreciation of art as a way of life, permeating personal, community, and national planning. A capacity for independent aesthetic judgment as a consumer and a producer, based on experimentation in design.
>
> Supporting the assumption that man has infinite value, our objective is to give each child the opportunity to develop his unique potential through creative activity and opportunity for aesthetic experience.
>
> As our society becomes more standardized, the areas for freedom of choice become more limited. Our objective is to give children the opportunity for independent decision-making and action through art activity.

---

[29]Ibid., p. 171.

Children can have equal opportunities for developing their abilities because of the diversity of media and the flexibility of results possible in art activities.

By learning to evaluate their own work and the work of others, children can increase their capacity for self-government.

The art program can give children an opportunity to work together. The unique contribution of each child can be seen in group-planned and group-executed projects in art, in social studies, and in science.

The use of reason can be exercised along with expressive intuitive activity. Self-criticism helps to unite the use of reason with the constructive use of emotion. One of our objectives is to help children become intellectually aware of what they are doing--to be able to evaluate their own work.

The processes of art necessitate the anticipation of new outcomes. This kind of behavior supports the democratic ideal of hope and work for the future.

It can help the child to develop visual sensitivity, to see more detail, to develop awareness of form and space, and to find more adequate ways of orienting himself to his environment. Art study can relate cognitive, visual, and tactile interpretations of things.

It gives the child a nonverbal means of organizing ideas, which supplements and reinforces his verbal learning. For children whose verbal ability has been inhibited, visual symbols can be a very important means of communication.

Art can give a child a direct means of constructive expression of emotion. Conflicts in values about art may have limited a child's opportunity to have aesthetic experiences, but this does not mean he has no need of them. Man needs the mirror of the arts, not only to raise his level of existence, but for his survival as a human being. Art, like language and religion, is a cultivator of human experience, basic to development.

Because children differ in rates of growth, one of our objectives is to so construct the art program that every child can succeed at his own over-all

level of readiness. We might call this our implementing objective--the only objective that will help us to reach all our other objectives.

Art is a visual history of the development of cultures. Objective: the history of mankind can become more real to children through empathic learning of other periods and societies.

Art is the basis of much of our communication system. Objective: Children should become aware of visual forms as communication. They should learn to judge what to accept and what to reject, rather than to be passive receptors.

Art is a live reflector of our present culture. Objective: Children can see art as a growing, changing part of life through their own participation.

Art is one of man's means for reflection of his personal and collective experiences. Objective: Art activity helps a child objectify and organize his own feelings and interactions in living.[30]

Some Important Research Trends in Art Education

Research, in most fields of academic endeavor, is divided into three basic areas or classifications. Davis describes these classifications:

> (1) historical research--investigating, recording, analyzing, and interpreting the events of the past for the purpose of discovering generalizations that are helpful in understanding the present and in predicting the future; (2) descriptive research--describing, recording, analyzing, and interpreting the present nature, composition, or process of phenomena; (3) experimental research--what will be when certain factors are carefully controlled.[31]

---

[30]Ibid., p. 172-179.

[31]Donald Jack Davis, "Research Trends in Art and Art Education," Art Education Journal of the National Art Education Association, (October 1967) Vol. 20, No. 7, p. 13.

The field of art education has since 1883 developed a body of research in each of these three areas. Davis capsulized this historical body of research:

> Research activity has become increasingly important in the field of education during recent years. As a vital and integral part of the larger field of education, art education has also experienced a phenomenal interest in research, especially since 1950. A survey and examination of the research literature relating to art and art education reveals some interesting facts and trends. Although the past 15 to 25 years have seen the most vigorous activity in research relating to the visual arts, scientific experiments of interest to artists and art educators were carried on prior to these years. As early as 1890, Wolfe[3] published the results of his investigations concerning the color vocabulary of children. A survey[4] of the research literature made in 1940 reveals that during the 57-year period between 1883 and 1939, approximately 162 scientific investigations relating to art and art education were carried out and published. These investigations were primarily related to four areas of investigation: (1) studies relating to color vision and color preference; (2) studies concerning drawing and/or graphic ability; (3) investigations of picture preferences and appreciation; (4) studies relating to tests and measurements in the field of art knowledge and appreciation and drawing ability.
>
> An examination of this early research relating to the visual arts reveals that much of the research activity was carried on by individuals in disciplines other than art, with many studies being conducted by psychologists and sociologists. In many instances it appears that art was being used only as a means to an end, without preliminary investigations into such vital and foundational areas as aesthetics, creativity, and artistic processes. Consequently, much early research resulted in sporadic and short-term investigations whose direct contributions to art education are questionable. By contrast, a survey[5] of the research literature in art education between 1940 and 1960 revealed an increased interest. Compared to the 162 scientific investigations relating to the visual arts published between 1883 and 1939, 210 scientific investigations relating to the

> visual arts were published during the 20-year period between 1940 and 1960.[32]

Research in art education has increased tremendously since World War II. The increase in the number of graduate programs, the need to substantiate belief in the literature and increased financial support are the major factors in this growth.

A general lack of interest in the area of art measurement up to 1940 creates a relative lack of research in the area of behavioral objectives for art activity. Since 1940, research in the field of art and the nature of the learner has enjoyed a substantial increase.

> In recent years researchers in art education have shown a great deal of interest in the study and teaching of the visual arts, with 38 investigations published in the literature between 1940 and 1960. Much of the work in this area has been descriptive in nature; nevertheless it has provided some valuable information and much needed direction for growth in art education; public school art programs--time allotments; motivational techniques, budgets and expenditures; teacher preparation; college art programs, graduate education in art education; teacher supply and demand; and art for special groups such as the mentally retarded and the art gifted.[33]

McFee comments on the direction of this new approach to research and art education.

> This new activity should include consideration of the implications derived from the sciences and art, because art education is concerned with the nature of the learner, his range of variability, and the subject matter field. Consequently,

---

[32]Ibid., p. 13.

[33]Ibid., p. 15.

> one of the most pressing research needs in the field of art education is the systematic and documented application of research findings in related fields to art education.[34]

Some Possible Rules for the Program Planner in Art Education

Deterline states: "A student can be creative and original only if he is prepared for it."[35]

It seems that an amount of cognitive knowledge is necessary in any area of the arts in order for the student to be able to reorder principles into products.

Programming information in the creative arts is, for any type of auto-tutorial experience, a difficult one. The programmer must encourage learning rather than develop models for the learner to copy. Cognitive and motor skills information seems to lend itself more effectively in the area of auto-tutorial learning.

Gilbert proposed a list of fourteen rules for the programmer to follow in order to use the impact and effectiveness of programmed learning to its fullest.

> Rule 1. If you don't have a gadget called a 'teaching machine.' don't get one. Don't buy one; don't borrow one' don't steal one. If you have such a gadget, get rid of it. Don't give it away, for someone else might use it.

---

[34]June King McFee, "Visual Arts: Psychological Implications of Individual Differences in the Perception-Delineation Process" (unpublished Doctor's dissertation, Stanford University, 1956)

[35]William A. Deterline, "Programmed Instruction and the Control of Behavior, Trends in Programmed Instruction," ed. Ofiesh and Meierhenry, Department of AV Instruction, National Education Association, Washington, D.C., 1964, p. 16.

This is a most practical rule, based on empirical facts from considerable observation. If you begin with a device of any kind, you will try to develop the teaching program to fit that device. The so-called 'teaching machine' is a disease, not a challenge to self-control, and the only safe cure is to get rid of it. The recommended treatment is the cold-turkey method--don't try to taper off on programmed or scrambled textbooks.

Rule 2. Resist the temptation to design formal experiments. You don't want to know <u>whether</u> one method teaches better than another, you want to know <u>what</u> method teaches best.

This rule is based on the simple logic that a really efficient method of teaching a thing would display itself in a 'control-experimental groups' study only if a really efficient method were used in the experiment. Thus you could conclude from the experiment that a method was unusually efficient only if you already knew it. In short, I am saying that the first function of this teaching laboratory is as a place of discovery, not a place to prove preconceptions.

Rule 3. Your prime purpose is to provide a student with a behavior repertory called subject matter. If that behavior repertory is, say, physics, your problem is to take him there from whatever repertory he now has which even vaguely approximates physics.

This rule is stated to emphasize the fact that a subject matter is a class of behaviors and that everyone has some behavior which approximates that behavior class. It is easy to forget that the behaviors one goes through to master the subject matter may be different from the actual subject matter behaviors. The failure to grasp fully the implications of this rule has been, in my experience, the biggest single stumbling block for people learning to program education. The natural tendency is to begin by breaking the subject matter down into small, concise units. While this is valuable for describing the repertory you wish to build, these behavior units usually are not the ones which will actually build that repertory. They are test items, not teaching guides.

Rule 4. Get yourself an expert teacher of the subject matter you wish to program. Be wary of a college professor; he may never have seen a student

learn. Remember that a good teacher is a more complicated, flexible 'teaching machine' than you could possibly build. If you can't get a good program into him, you will never get one into a mechanical gadget.

This rule is not meant to suggest that the teacher is to tell you how to build the repertory. Quite to the contrary. The student will tell you this. The teacher is only the place to start.

Rule 5. Get yourself one student. I repeat, one student. You are about to perform an experiment in which you are permitted no degrees of freedom--that is, if the word 'self' in 'self-instructional' can be taken seriously. Once you have discovered an efficient program for one student, you will have described the gross anatomy of the most generally useful program.

Rule 6. You have to start somewhere, but forget that you are an expert on human learning. You aren't. Assuming you are the teacher, you should begin with the most trustworthy facilities you have available: First, trust your common sense; next, use the approximations to principles of programming that have been set down by a few people. Remember, these people probably are not more expert than you, only more audacious. They may be mostly wrong. Use their principles only as a starting place.

Rule 7. Obtain the following materials: paper, pencils, and index cards. Use no gadgets unless they are part of the subject matter. For example, if you are programming home economics, you may need an electric toaster. Resist the temptation to use the toaster as a 'teaching machine.'

Rule 8. You are now ready to begin programming. Think of the process as an exploratory experiment in which you do not know what the effective variables are. Your problem is to discover them. Using index cards, write out a series of questions, probes, etc., to which the student can respond. Write these items in a way that you think will lead him to a mastery of a small part of the subject matter.

It seems a good idea to write these items while having an imaginary student before you with whom you are carrying out an imaginary interchange.

Rule 9. Take your first crude effort to the student. Remember, he is going to teach you. This student cannot fail. If he doesn't get where you want him to go, you have failed. Try something else. In the absence of anything better, let whim be your guide. If you come to a dead end, vary your approach until you have gotten him where you want him to go. Tape record all sessions. The important thing to remember is to keep varying your behavior until you are successful and to describe what you do.

Rule 10. Once you have learned how to get the student through part of the material, keep going. Pay the teacher and student so they won't leave you. This can be dull work. Don't invest much time in constructing materials before you have tried them out on the student.

Rule 11. Once the teacher really appreciates immediate reinforcement and has discovered that the student alone can tell him how to teach and once he has learned to keep varying his approach, he is more of an expert than you. Remember, it is easier to teach a physics teacher what you know about programming than it is for him to teach you physics.

Rule 12. Take your time. Education has been waiting for you since the dawn of history. When the student has the repertory you wanted to build, and when you can describe how he got that repertory, you are ready for the next step. Edit the material and try it on another student. Make whatever changes necessary for your program to take care of both students. After fewer than 10 tries, you will have a program which will teach 98 percent of the students. And you will have discovered how to adjust the program for individual differences.

Rule 13. Don't be too concerned that your program is not perfect. It works. It can always be revised. If you have followed the rules...you have done a respectable job. You can describe an exact procedure for getting most students from oblivion to mastery--not to a C average. Now, and only now, you are ready to think about automation.

Rule 14. Prepare to automate the program by discarding any 'teaching machines' which, in your weakness you kept around. Remember that you have a teacher who is a vastly complex machine and you have discovered how to make him work with efficiency. All you need to do now is to substitute more economical devices for the teacher's operations wherever

> you can. You probably will end with several devices. Examine each operation and fit a device to it. Never let the device dictate the program.[36]

Gilbert explains these rules:

> These rules are designed to guide one who wishes to apply whatever we already know to the task of engineering a specific educational problem. If we wish to discover principles which are not bound to a particular problem, and are still useful to the problems of education, we must resort to a much more expensive and elegant laboratory. There is no middle ground.[37]

Rasmussen states: "Of all the newer instructional media, programmed learning techniques and materials have had perhaps the least experimentation in the field of art instruction."[38]

The following table of instructional media stimulus relationships to learning objectives is included to give the reader an overview of the effectiveness of media utilization.

---

[36]Thomas F. Gilbert, "On the Relevance of Laboratory Investigation of Learning to Self-Instructional Programming, Teaching Machines and Programmed Learning," Teaching Machines and Programmed Learning, edited by A. A. Lumsdaine and Robert Glaser (Washington, D.C., National Education Association, 1960), pp. 478-481.

[37]Ibid., p. 481.

[38]Warren I. Rasmussen, "Instructional Process and Media Integration in the Creative Arts," Instructional Process and Media Innovation, edited by Robert A. Weisgerber (Palo Alto, California: American Institute for Research and Chicago: Rand McNally & Co., 1960), p. 157.

Instructional Media Stimulus Relationships to Learning Objectives[39]

Instructional Media Type	Learning Objectives	Learning Factual Information	Learning Visual Identifications	Learning Principles Concepts and Rules	Learning Procedures	Performing Skilled Perceptual Motor Acts	Developing Desirable Attitudes, Opinions & Motivations
Still Pictures		Medium	HIGH*	Medium	Medium	low	low
Motion Pictures		Medium	HIGH	HIGH	HIGH	Medium	Medium
Television		Medium	Medium	HIGH	Medium	low	Medium
3-D Objects		low	HIGH	low	low	low	low
Audio-Recordings		Medium	low	low	Medium	low	Medium
Programmed Instruction		Medium	Medium	Medium	HIGH*	low	Medium
Demonstration		low	Medium	low	HIGH	Medium	Medium
Printed Textbooks		Medium	low	Medium	Medium	low	Medium
Oral Presentations		Medium	low	Medium	Medium	low	Medium

*Procedures used in this pilot study.

[39] Ibid., p. 156.

Summary

This chapter notes the relative newness of auto-tutorial programming in art education. The relationship between the cognitive and affective domains are explored. The need to establish behavioral objectives in the field of art education is noted. Research trends in art education are discussed and the chapter is finalized with a list of possible rules for the program planner in art education and a useful chart which examines the Instructional Media Stimulus Relationships to Learning Objectives.

CHAPTER III

CONDUCT OF THE STUDY

This chapter will describe the instrument used in this pilot study: the population sample, methods and procedures used to collect the data, and the statistical techniques used in this study.

The instrument[40] used in this pilot study was developed over a period of six years during which time the writer was an art instructor at Delta College, University Center, Michigan. Teaching responsibilities included basic drawing, basic design and beginning and advanced methods in art education. The need to organize and develop an effective review booklet on the principles of basic design was caused by the fact that no single basic text on design principles contained enough variety of design principles to meet the needs of both the instructor and student.

Twenty-five basic principles were discovered to be the basic minimum number of design principles needed to form a basic cognitive language for design skills.

These basic design principles are:

1. The Representational Mode
2. The Abstract Mode

---

[40]See Appendix A for complete instrument.

3. The Non-Objective Mode
4. The Organic Mode
5. The Inorganic Mode
6. The Organic-Inorganic Mode
7. Accepting the Working Surface
8. Denying the Working Surface
9. Central Obvious Mode of Balance
10. Central Occult Mode of Balance
11. Axial Obvious Mode of Balance
12. Axial Occult Mode of Balance
13. The Horizontal Mode
14. The Vertical Mode
15. The Diagonal Mode
16. The Rotating Mode
17. The Accidental Mode
18. Bleeding Forms
19. Floating Forms
20. Connecting Forms
21. Overlapping Forms
22. Penetrating Forms
23. Interlocking Forms
24. Gradation of Forms
25. Alternation of Forms

Historical usage has divided the forms of art into five areas: line, color, texture and pattern, value, and shape. Each of the twenty-five basic principles of design is divided into these five areas. The reader of the instrument then has a total of 125 possible design arrangements, not counting any further cross-over combinations.

Definitions are given for each basic principle and a small rectangle is provided for the student to make notations for study, review or thought organization for a design project.

An example,[41] drawn from the contemporary art scene, is coupled with each of the twenty-five basic principles to demonstrate a possible use of the principle in question.

The small diagrams, 125 in total, were composed and drawn by the writer to fit the exact visual image needed to fully explain the sub-concept.

Using photo-copy techniques, the entire instrument was committed to a color-slide module program. The high cost of color printing prevented the possibility of using color in the booklet. Six duplicates of the color-slide program were arranged in six carrel learning environments.

An audio-tape presentation[42] was developed to instruct the student on the content and use of the color-slide program. The repetitive nature of the slide presentation demanded that the script be carefully composed to elicit a favorable and positive response from the student. A fading technique was used to avoid repetitive instructions after seven varied verbal versions. The remaining eighteen concepts were then viewed without the audio-visual tape. A final review and instructions on the use of the review booklet were given at the termination of the student-viewing cycle.

The necessary special equipment needed to present the instrument includes a tape deck with tape, earphones,

---

[41]See Appendix B for complete listing of design examples used in the Instrument.

[42]See Appendix C for audio-tape script used as part of the Instrument.

Carousel projector with 3" lens, a set of fifty color-slides and a viewing screen.

The final phase of the instrument was a post-test.[43] This post-test was composed for use by both the experimental and control groups. It consisted of fifty test items divided evenly between "true" or "false" responses and multiple-choice items. Care was taken so that a balance of concepts[44] was distributed evenly throughout the post-test. A "T" test analysis to determine the level of significant difference between the post-test scores of the experimental and control group was executed.

An attitudinal questionnaire[45] was developed to examine the individual attitude of each member of the experimental group. The topical content of this questionnaire deals with the effectiveness of the instrument as a teaching device. It was designed to determine the student's reaction, positively or negatively, to the program. The student was asked whether or not the instrument was an improvement on the present course structure. He was also asked whether or not he preferred the auto-tutorial system in dealing with art principles. The present course structure is lecture, readings and examinations.

The control group information input was a standard slide lecture designed for a forty-minute class period. This activity was given the same day as the auto-tutorial program.

---

[43]See Appendix D for post-test.

[44]See Appendix B for item exposure balance.

[45]See Appendix E for attitudinal questionnaire.

A Personal Inventory[46] was designed to elicit information on the academic background and personal interests of each student and used by the instructor of the class. The Personal Inventory was incorporated into this study in order to develop an in-depth list of seventeen variables. A time table[47] was organized to insure a smooth traffic flow of all 100 participants throughout the experiment.

A statistical analysis was made of this information to discover if any of the variables contained a meaningful correlation of more than $\pm$ .03.

Variables which are considered in this study are:

1. Age of Student
2. Sex of Student
3. High School Size
4. Major Related to the Arts
5. Past Experience with the Arts
6. Time Taken on Experiment
7. Academic Interests Related to the Arts
8. Secondary Interests Related to the Arts
9. Professional Choice Related to the Arts
10. Prior Knowledge of Design
11. Attitude Toward Design
12. Basic Reaction to the Auto-Tutorial Experiment
13. College Class Level
14. Is Textiles and Design a Core or Elective Course?

---

[46]See Appendix F for Personal Inventory.

[47]See Appendix G for Pilot Study Timetable.

15. Past Experience with Auto-Tutorial Environment
16. Group
17. Post-test

The last function of data collection in this study was computing the mean average of the final grades received by both the experimental and control groups. This was undertaken to test the difference in academic performance of both groups in the areas of content in the course, Textiles and Related Arts, offered by the College of Home Economics. This content area was chosen because the students who were enrolled in this course were interested in the elements of design but are not necessarily majoring in art. The population used in the study was randomly selected by drawing the names of fifty persons for each group out of a total of 250 students. Contaminants in this study were held to a minimum by the random selection of the population and keeping the information retention time as nearly equal as possible between the experimental and control groups.

Summary

This chapter delineates the basic elements of the study. A descriptive analysis of the instrument is made along with the background of its development. A discussion of the various statistical measures is described and a rationale on the population selection is offered.

Basic elements of the study are:

1. Review Booklet (both groups)
2. Auto-tutorial Experience (experimental group)
3. Attitudinal Questionnaire (experimental group)
4. Standard Slide Lecture (control group)
5. Equal Retention Time (4 days) (both groups)
6. Post-Test (both groups)
7. Personal Inventory (both groups)
8. T-test for Significant Difference (both groups)
9. Correlation of 17 Variables (both groups)
10. Final Grade Analysis (both groups)

CHAPTER IV

ANALYSIS OF THE DATA CONCERNED WITH THE PILOT STUDY

Introduction

This chapter is divided into four sections:

1. Results of the attitudinal questionnaire administered to the experimental group.
2. Results of the post-test administered to both the experimental and control groups, along with the results of a "T" test for significant difference.
3. Results of a statistical correlation on seventeen variables developed from the personal inventory questionnaire.
4. Results of the final grade analysis of both the experimental and control groups.

I. Table 1.
Results of the Attitudinal Questionnaire

	Positive:	No.	%	Negative:	No.	%
Question 1.	Would you consider the auto-tutorial program, "Decisions in Design," a valid method of teaching design?					
Response:		50	100		0	0
Question 2.	Would you say that it was an enjoyable experience?					
Response:		50	100		0	0
Question 3.	Do you feel that other programs of this nature would improve the basic course, TRA 140?					
Response:		47	94		3	6
Question 4.	Would you rather learn matters of this nature in a regular lecture environment with an instructor?					
Response:		12	24		38	76

An examination of the responses collected on the attitudinal questionnaire reveals a total agreement on the part of all fifty respondents that the instrument is a valid method of teaching design.

There is also total agreement from all fifty respondents that the auto-tutorial experience was a pleasant one.

Of the fifty respondents, 94 percent agreed that a program of this nature would be an improvement in the basic course, TRA 140.

Of the fifty respondents, 76 percent preferred the auto-tutorial environment over the standard lecture method.

An overview of these responses seemed to indicate a strong case for the inclusion of programs in the auto-tutorial format in the basic course, Textiles and the Related Arts, offered by the College of Home Economics.

II. Results of the post-test administered to both the experimental and control groups, and the results of the "T" test for significant difference.

A. Results of the post-test.

This examination was administered to a total of 100 persons, fifty of whom had experienced the auto-tutorial environment and fifty of whom had attended the standard lecture presentation. The results of the post-test are:

Table 2.
Post-Test Analysis Scores

	Control Group	(50 persons in each)	Experimental Group
Mean Average	36.70		38.78
Standard Deviation	5.199		5.088

A review of these results shows the experimental group (auto-tutorial method) exceeding the mean average scores of the control group by 2.08 mean average points.

B. Results of the "T" Test analysis for significant difference:

Table 3.
Analysis of Variance on Post-Test Scores

Sources of Variance	Sum of Squares	Degree of Freedom	Mean Square	F Statistic	$\sqrt{F} = T$
Between Categories	108.1599991	1	108.1599991	4.08768	
Within Categories	2593.07999796	98	26.45999998		
Total	2701.23999786	99			$\sqrt{4.08768} = 2.02180$

Examination of the above table shows the rejection of the statistical hypothesis, u experimental = u control; and the acceptance of the experimental hypothesis, u experimental u control. The alternative hypothesis, u experimental u control does not apply in this pilot study.

The following statistical calculation validates this conclusion.

T or $\sqrt{F}$ is greater than tabled "T" value for (60 degrees of freedom and X = .05) = 1.67, therefore,

$\sqrt{F} > 1.67$

$T > 1.67$

$\sqrt{4.08768} > 1.67$ by 2.02180 - 1.67000 = .35180

A relative significant difference in the post-test scores is present in favor of the experimental group (auto-tutorial method).

III. Results of a correlation on seventeen variables developed from the personal inventory questionnaire.

Table 4.
Variables Used in the Correlation

Group	1
Post-Test	2
Age	3
Sex	4
High School Size	5
Major Related to Art	6
Time	7
Academic Interests Related to Art	8
Secondary Interests Related to Art	9
Professional Interest Related to Art	10
Prior Experience with Design	11
Attitude Toward Design	12
Basic Reaction to Auto-Tutorial Program	13
Michigan State University Level	14
TRA 140 Elective or Core Course	15
Prior Experience with Auto-Tutorial Method	16
General Experience in the Arts	17

Table 5.
Correlation Results of the Seventeen Variables Ranging from Weak to Very Strong

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1																	
2																	
3																	
4																	
5			-.32														
6						+.38											
7																	
8	+.48																
9																	
10						+.32		+.67									
11								+.40		+.53							
12																	
13	-.98								-.47								
14						-.30											
15																	
16																	
17																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17

Blank spaces represent correlations ± 3. Note: A correlation of + or -10 is perfect.

Table 5 plots eleven correlations which range from weak to very strong. A discussion of each of the seventeen variables follows:

Variable 1. Group (Experimental and Control)

Group and Reaction to Auto-Tutorial Program has a correlation coefficient of -.98168. From this strong correlation it is strongly demonstrated that those participants who took part in the program had a favorable reaction toward it.

A second correlation within this variable occurred between Group (Experimental and Control) and Time Utilization. A moderate correlation-coefficient of +.48428 demonstrates that the control group took more time than the experimental group. The average time taken by the experimental group was thirty-five minutes per student. The control group took a total of forty minutes per student in the study, which creates a time saving of 250 instructional minutes by using the auto-tutorial system.

Variable 2. Post-Test

There were no significant correlations developed between the Post-Test and the other sixteen variables.

Variable 3. Age

A weak correlation of .32722 was developed between Age and High School Size. This correlation has no significant value to this study.

Variable 4. Sex

No correlations were developed since all in this category were females.

Variable 5. High School Size

There were no significant correlations developed between High School Size and the other sixteen variables.

Variable 6. Major Related to the Arts

A weak correlation of -.30344 developed between Major Related to the Arts and whether TRA 140 was an Elective or a Core Course in a given participant's program. This correlation demonstrates that those who are taking TRA 140 as an elective will probably major in an art-oriented program.

A weak correlation also developed between Major Related to Art and Professional Career Choice of .32865. This demonstrates that most of those participants majoring in art are making it their professional career.

Another weak correlation of .38381 developed between Major Related ot the Arts and Academic Interest in Art. This demonstrates that those participants whose academic interest are related to the Arts may elect to major in that subject matter area.

Variable 7. Time

A moderate correlation of .47448 developed between Time taken on the experiment and Reaction to the Auto-Tutorial Program. This correlation demonstrates that those who took a shorter length of time to do the experiment seemed to prefer it as a method of teaching the principles of design.

Variable 8. Academic Interests Related to the Arts

A moderate correlation of .67956 developed between Academic Interest Related to the Professional Interests

Related to Art. This demonstrates that those participants whose Professional Career Choice is Related to the Arts have Academic Interests in the Arts.

Variable 9. Secondary Interests Related to Art

A moderate correlation of .40438 developed between those who have Secondary Interests Related to Art and Professional Interest Related to Art. This demonstrates that those whose Secondary Interests are Related to Art are interested in the possibility of a career with a Professional Interest Related to Art.

Variable 10. Professional Choice Related to Art

A moderate correlation of .53462 developed between Professional Interest Related to Art and Prior Experience with Design. This demonstrates a moderate relationship between those who have had some Prior Experience with Design and those who have indicated a Professional Interest in Art.

Variable 11. Prior Experience with Design

No further correlation of value appear in the table.

Variable 12. Attitude Toward Design

No correlations occurred with this variable because all participants agreed that they favored and enjoyed design, thus this variable becomes constant.

Variable 13. Basic Reaction to Auto-Tutorial Program

No further correlations occurred in this category.

Variable 14. Michigan State University Level

All participants were at the freshman class level so no correlations occur in this category.

Variable 15. TRA 140 an Elective or Core Course

No further correlations occur in this category.

Variable 16. Prior Experience with Auto-Tutorial Method

No correlation occurred in this category because all participants had no prior experience with this type of learning situation.

Variable 17. General Experience in the Arts

No further correlations occurred in the table for this item.

IV. Results of the Final Grade Analysis

The participants involved in the early phase of this study completed the course, TRA 140. This was a fortunate circumstance because a valid final grade analysis could be accomplished. The final grade given by the instructor to all 100 participants in both the experimental and control groups was tabulated and compared with the following results.

Table 6.
Final Grade Analysis of the Control and Experimental Groups

	Experimental Group	Control Group
Average mean of final grade	2.70	2.46
Difference between groups	.24	

An examination of this table reveals that the experimental group exceeded the performance of the control group by .24 points on the 0.0-4.0 rating scale. This difference is small but significant change for the better in total performance on the part of the experimental group.

Summary

This Chapter examined the statistical results of the pilot study. Part I summarized the results of the attitudinal questionnaire. The computation of these figures revealed that the auto-tutorial experiment was a pleasant experience. Of the total respondents, 94 percent indicated that the auto-tutorial program was an improvement over traditional teaching methods; 76 percent preferred the auto-tutorial sequence over the standard-lecture system and all participants indicated that they felt that the auto-tutorial format was a valid method of teaching the principles of design.

Part II examined the results of the Post-Test given to both the experimental and control groups. The results of the examination demonstrated a relatively superior performance on the part of the experimental group by 2.08 mean average points.

Part II also examined the results of the analysis of variance on the Post-Test scores. A tabled T value of 1.67 (60 degrees of freedom and SD = .05) compared to the F statistic of $\sqrt{4.08768}$ creates a relative significant difference between the two groups which rejects the statistical null hypothesis and accepts the experimental hypothesis.

Part III discussed the correlations of seventeen variables developed from the personal-inventory questionnaire. Eleven correlations were found to be significant enough to be of interest in this study.

CHAPTER V

I. SUMMARY AND DISCUSSION

Two groups of freshmen women participated in an experimental pilot study to determine if twenty-five basic principles of design could be meaningfully and effectively presented in an auto-tutorial learning environment. Four hypotheses were generated from the climate of the study.

(1) A saving of time would result in the auto-tutorial phase of the study.

(2) The attitude of the experimental group would be good as a result of the different type of learning situation.

(3) The auto-tutorial system of instruction would do a better job in transferring information about design principles.

(4) The participants in the experimental group would register a higher performance on a final grade tabulation of both groups.

A summary of these four assumptions and the statistical outcomes of each follows:

(1) A Saving of Time Would Result in the Auto-Tutorial Phase of the Pilot Study.

Traditionally, classes are set up on a modular schedule conforming to an hourly basis. Textiles and the Related Arts

is no exception. A fifty-minute class period three times per week is set aside for this subject. Present procedure demands that the instructor plan effective lectures for most of these thirty class periods. Subject content of the course deals with cognitive information related to how art and design relate to the use, manufacture, identification, appreciation and history of textiles. One area was picked by the writer to demonstrate that the auto-tutorial format could save the instructor an appreciable amount of time. This study area was the principles of design. The enrollment in the class was 250 students. Traditionally, the instructor, using the standard lecture system of 50 minutes required 10,000 minutes (250 x 40) of class time to discuss the basic principles of design. The saving of this amount of time would allow the instructor to use alternative forms of instruction. The average time taken by the experimental group was thirty-five minutes, which represents a total group time usage of only 9,250 minutes. A saving of 750 minutes, or 18 1/2 hours, was realized.

(2) The Attitude of the Experimental Group Was Good as a Result of the Different Type of Learning Situation

The results of a brief questionnaire completed immediately after the carrel experiment by all fifty participants was quite encouraging. The total number of responses possible on the questionnaire was 200, 185 of which were positive and 15 negative.

Question 1, dealing with the auto-tutorial method, as a valid system for teaching design principles, resulted in a total positive response on the part of all fifty students.

Question 2, which asked if they enjoyed the experience, elicited a total positive agreement on the part of all 50 participants.

Question 3, concerning the concept that the auto-tutorial program was an improvement on the course, resulted in a strong positive response of forty-seven affirmative and three negative.

Question 4, dealing with a preference between the auto-tutorial system and the standard lecture method resulted in only twelve of fifty prefering the regular lecture application.

An examination of the results of this attitudinal questionnaire clearly demonstrates, in this pilot study, that the fifty participants of the experimental group positively responded to the auto-tutorial format in which cognitive skills of the principles of design were stressed.

(3) The Auto-Tutorial System Would Do a Better Job in Transferring Information About Design Principles.

The Post-Test scores of both the experimental group and the control group were compared by the use of a statistical analysis for significant difference (T test). The results of this analysis gave evidence that the experimental group performed at a higher level (2.08 mean average points) with a relatively significant difference of 2.02180.

To complete this analysis, an examination of seventeen variables was undertaken. Ten related correlations occurred, demonstrating the following patterns of behavior on the part of the fifty students in the experimental group:

The experimental group had a strong favorable reaction to the auto-tutorial method of teaching the principles of design.

The experimental group took a shorter period of time to complete the exercise.

Those students, who were taking Textiles and Related Arts 140 as an elective course will probably not be art majors. Those who are majoring in the arts will most likely choose a career related to the arts.

Participants whose academic interests are in the arts and those who took a shorter period of time on the experiment expressed a favorable reaction to the auto-tutorial sequence.

Those students who have made a career choice in the arts and those students who had a prior knowledge of design principles have strong academic interest in the art field.

Participants whose career choice was in the field of design had strong secondary interests in the area of design; and those whose professional choice was related to the arts had some prior experience in the field of design principles.

(4) The Participants in the Experimental Group Would Register a Higher Performance on a Final Grade Tabulation of Both Groups

The experimental group of fifty students amassed an average of 2.70 in the final grades given by the instructor. The control group amassed an average of 2.46 on this tabulation, a difference of .24 in favor of the experimental group based on a 4.0 basis. This improved performance on the part of the experimental group most likely arises out of the fact that the experimental group had the opportunity to proceed at its own rate and had an opportunity to review the material as it was being presented. Vocabulary skills gained by the experimental group through being exposed to the carrel learning

environment aided the student in responding to areas of discussion encountered during the rest of the course. The mode of presentation was the only outstanding variable which would cause the difference in student performance.

II. CONCLUSION

Implications of the Pilot Study for the Field of Art Education

It has been noted that the field of art education has not experienced an in-depth body of research on the effectiveness of the systems approach, programmed learning and application of the auto-tutorial method of instruction.

The dramatic increase in student population in school systems at all levels indicates a need to discover a better methodology to transmit cognitive skills in all areas of academic interest. Our new technology has offered a wealth of new ideas, particularly usable in the area of motor skills and cognitive education. Keeping individual needs and differences in mind, the implications of this pilot study suggest a number of positive areas of betterment in art education, using the auto-tutorial system of instruction.

Examining the traditional curriculum areas of art we find a typical breakdown of interest areas, such as History of Art, Philosophy of Art, Art Practice, and Art Education (teacher training).

Implications of this pilot study have an effect on all four areas. This pilot study deals, for the most part, with the last two areas: art practice and art education. These

two areas are highly integrated activities. The latter emphasizes the need for sensitive perception and self-expression on the part of our youth in the elementary and secondary schools. An effective art instructor or coordinator needs to have awareness and command of the multiplicity of skills and knowledge in the areas of art practice and child development.

Perusal of any important texts on these matters reveals the vast amount of cognitive knowledge needed on the part of the art educator.

How to do art? In this category alone, one finds literally hundreds of ideas for auto-tutorial programs that could be conceived: wood-block cutting, how to make a serigraph, the potter's wheel, watercolor, monoprints, tie and dye procedures, lithography, silversmithing, etching, and painting a picture, to name only a few. Nomenclature, tool usage, processes, and outstanding examples of art products are obvious areas of interest to the programmer of auto-tutorial units in art education.

The task of finding a subject in art to program into the auto-tutorial method is the easiest job of all. How to program effectively the motor skill tasks and cognitive concepts is the most difficult. The programmer must be successful not only in information transmitting but he must also make every effort to expose the student to the excitement of the learning task while maintaining individual differences. Art is a highly individualistic activity dealing with the affective domain. Programming of art should never stress copying. The student should be encouraged to use the information in art programs to develop an entry behavior prior to beginning an art activity or making a judgment about art. The capacity to limit, select, and

proceed with freedom is essential to the art student and teacher in all levels of art education. Each program should be a milestone in creating a positive behavior which builds on succeeding experiences, which eventually transforms the undecided, grouping students into a firmly directed designer of art principles, products and judgments.

How to program concepts in art education is a difficult question, and it can be answered in many ways. The writer suggests the following as a possible solution and summarization of techniques of programmed instruction in art education:

A. Program Unit Selection

1. What concepts do I want to teach about art and in art?

a. Concepts will be shaped by assumptions about what art is.

2. Limitations of the area to be covered in this unit.

3. Is there an internal logic to the material: visual? reasonable? or based on performance?

4. In your judgment is it more efficiently taught in programmed form or by conventional methods?

5. What prior knowledge and experience in art is required of students?

6. State the desired terminal behavior; that is, what should the student be able to do after taking the program that he could not do before? What is the quality level he must reach?

B. Subject Matter Selection

1. What instructional things are to be programmed?

a. Knowledge: (1) the terms; (2) concepts; (3) issues; (4) understandings in art history; (5) aesthetic theory; and (6) other semantic information.

b. Behavior: (1) skills and techniques; (2) attitudes; (3) values; (4) self-evaluation (?);

(5) self-discovery; (6) invention (?); (7) creativity (?). Note: Perhaps originality of thought can be shaped by rewarding behaviors that are both unusual and adaptive.

c. Visual Perception: (1) noticing details and figural information, forms, color, space, and texture in the natural, artificial and artistic forms of our environment; (2) design principles.

2. What do I want the student to do?

a. Student Reactions: notice, discriminate, understand, appreciate, restructure given forms, make unusual forms.

b. Terminal Behavior or Final Goal: (1) creativity? (2) self-discovery? (3) behavioral information, (4) figural information, (5) semantic information.

C. Unit Composition:

1. Aims of the unit as above; include statement of terminal behavior.

2. Outline in detail the reactions desired and the content (including visual) required to elicit them.

3. Develop a sequence based on the above (e.g., increased achievement in guided discovery, multiple discrimination, stimulation, knowledge--including non-verbal.

4. Determine step size. (Err on side of too large a step. Correct step size can often be determined in testing.)

5. List methods of eliciting responses; use as wide a variety as appropriate.

6. List supplementary materials to be included and prepare or assemble them:

a. panels, slides, etc.
b. materials to improve manipulative skills
c. color coding
d. pre-tests and post-tests

7. Make sure you have made the most of the possible techniques or formats: (a) linear; (b) branching; (c) mathetics; (d) mixed; (e) auto-elucidative questioning.

8. Are connections between related units clear, logical?

D. Test and Revise

1. Roles of the editor (teacher-writer) and the student critic(s)--one, two, or three; editors should be proficient in subject field.

2. Procedures for testing the program: text vs. machines.

3. Administration of program to groups.

4. Use of previously prepared tests for Pre- and Post-Tests.

   a. Statistical methods
   b. Item analysis: things a trial test does, or does not, show.

5. Self-evaluation by learner, who discusses what he thinks he is learning; how he feels about art; and where he is puzzled.

6. Complete revision of the program.

E. Use the Tested Programs (and submit them to others for use)

1. Descriptive material submitted with program should include (a) statement of objectives; (b) description of developmental and field tests; (c) results obtained in final tests after revisions.

2. Problems of Administration:

   a. Existing curriculum structure; place for programmed materials in it; financing.
   b. School time and facilities of art room or multi-purpose classroom.
   c. What to do with students who finish early, the gifted, the slow learner, the culturally deprived.

3. Communicate results:

   a. within own school community
   b. feedback to editor of program
   c. professional journals

Note: The above material suggested in part by Dr. Robert Kline, Director of Media Services, University of New Mexico, Albuquerque.

III. RECOMMENDATIONS

A careful examination of this pilot study will no doubt give rise to questions about limitations and weaknesses. Extreme care was taken to randomly select 100 names from a total of 250 possibilities. A larger population would have been a more effective measure of results. Repeat studies on other similar populations would also be useful. Selection of visuals could be changed and better diagrams composed to demonstrate each of the twenty-five principles. Retention time between the treatment and the Post-Test for both the experimental group and the control group was not exact, although efforts were made to keep this difference to a minimum. Limitations of this nature should be carefully reviewed and controlled in future studies of this type and subject matter.

Individual differences and the elusive character of the affective domain should not be viewed as negative factors, but as a challenge to the researcher in the area of individual behavior and performance in art education.

BIBLIOGRAPHY

BIBLIOGRAPHY

American Educational Research Association. "Audio Visual Communication," Encyclopedia of Educational Research. New York: The MacMillan Co., 1960.

Anderson, Harold H. "Creativity in Perspective," Creativity And Its Civilization. Ed. Harold H. Anderson. New York: Harper and Brothers, 1959.

Anderson, Harold H. "The Nature of Creativity," Studies in Art Education. Washington, D. C.: National Art Education Association, I, No. 2 (Spring 1960), pp. 10-17.

Barlow, J. A. "Project Tutor," Psychological Reports, Vol. 6 (1960), pp. 15-20.

Barron, Frank. "The Psychology of Imagination," A Source Book for Creative Thinking. Ed. Sidney J. Parnes and Harold F. Harding. New York: Charles Scribner's Sons, 1962.

Beck, J. "On Some Methods of Programming," Automatic Teaching: The State of the Art. Ed. E. H. Galanter. New York: John Wiley and Sons, 1959. Chapter 3, pp. 55-62.

Beittel, Kenneth. "Art," Encyclopedia of Educational Research. Ed. Chester W. Harris, 3rd. ed. New York: The MacMillan Co., 1960.

Berlo, David. The Process of Communication. New York: Holt, Rinehart & Winston, 1960.

Bern, H. A., et. al. "Reply to Questions About Systems," Audio-Visual Instruction. May 1965, p. 367.

Bethers, Ray. Composition in Pictures. New York: Pitman Publishing Co., 1956.

Birch, Herbert G., and Morton L. Bitterman. "Sensory Integration and Cognitive Theory," Psychological Review, Vol. 58 (September 1951), pp. 335-361.

Bloom, Benjamin. Taxonomy of Educational Objectives, Part I: Cognitive Domain. New York: David McKay Company, Inc., 1960.

Bloom, Benjamin. Taxonomy of Educational Objectives, Part II: Affective Domain. New York: David McKay Company, Inc., 1964.

Bourisseau, Whitfield, O. L. Davis, Jr., and Kaoru Yamamoto. "Sense-Impression Responses to Differing Pictorial and Verbal Stimuli," AV Communication Review, Vol. 13 (Fall 1965), pp. 249-258.

Briggs, L. J. "Two Self-Instructional Devices," Psychological Reports, Vol. 4 (December 1958), pp. 671.

Broadbent, Donald E. Perception and Communication. New York: Pergamon Press, 1958.

Brogden, Hubert E., and Thomas B. Sprecher. "Criteria of Creativity," Creativity: Progress and Potential. ed. Calvin W. Taylor. New York: McGraw-Hill Co., 1964.

Burkhart, Robert C. Spontaneous and Deliberate Ways of Learning. Scranton, Pa.: International Textbook Company, 1962.

Carpenter, C. Ray. "Psychological Concepts and Audio-Visual Instruction," AV Communication Review. Vol. V (Winter 1957), pp. 361-369.

Conant, Howard, and Arne Randall. Art in Education. Peoria, Ill.: Charles A. Bennett, 1963.

Corrigan, R. E. "Automated Teaching Methods," Automated Teaching Bulletin, Vol. 1 (December 1959), pp. 23-30.

Coulson, John E. "Combining Educational Techniques," Perspectives in Programming. Ed. Robert T. Filep. New York: The MacMillan Co., 1963.

Crowder, Norman. "Automatic Tutoring by Intrinsic Programming," Teaching Machines and Programmed Learning. Ed. Albert Lumsdaine and Donald Glaser. Washington, D.C.: National Education Association, 1950, pp. 286-304.

Crutchfield, Richard S. "Independent Thought in a Conformist World," Conflict and Creativity. Ed. Seymour M. Farber and Roger H. L. Wilson. New York: McGraw-Hill Co., 1963.

Czurles, Stanley A. "Milestone in Research for Art Education," Research in Art Education, Art Education Bulletin, XIV, (May 1957) pp. 13-14.

Dafoe, Don M., et. al. Elementary Art Guide. Juneau, Alaska: Juneau Public Schools, 1965.

Dallenbach, K. M. "The Effect of Practice Upon Visual Apprehension in School Children," Journal of Educational Psychology. Vol. 5 (1914), pp. 321-344.

D'Amico, Victor. Creative Teaching in Art. Scranton, Pa.: International Textbook Co., 1953.

Davis, Donald Jack. "Research Trends in Art and Art Education," Journal of the National Art Education Association. Vol. 20, No. 7 (October 1967), p. 13.

Davis, R. "The Human Operator as a Single Channel Information System," Quarterly Journal of Experimental Psychology. Vol. 9 (August 1957), pp. 119-129.

DeFrancesco, Italo, I. Art Education--Its Means and Ends. New York: Harper and Brothers, Publishers, 1958.

Department of Audio Visual Instruction, National Education Association, Visual Communication. Washington, D.C.: National Education Association, 1960.

Deterline, William A. "Programmed Instruction and the Control of Behavior," Trends in Programmed Instruction. Ed. Ofiesh and Meierhenry. Washington, C. C.: Department of Audio-Visual Instruction, National Education Association, 1964.

Finn, James D. "Automation and Education II; Automatizing the Classroom--Background of the Effort," AV Communication Review. Vol. 5 (Spring 1957), pp. 451-467.

Finn, James D. "Technology and the Instructional Process," AV Communication Review. Vol. 8 (Winter 1960), pp. 5-26.

Flanagan, John E., "Implications of Research in Creativity," Future Implications of Creativity Research. Pasadena: A One Day Symposium Co-sponsored by Los Angeles State College and Chouinard Art Institute, J. Leonard Steinberg, Coordinator, March 10, 1962.

Gaitskell, Charles D. Children and Their Art. New York: Harcourt, Brace & World, Inc., 1958.

Gagne, Robert M. The Conditions of Learning. New York: Holt, Rinehart and Winston, 1965.

Getzels, Jacob W., and Philip W. Jackson. Creativity and Intelligence. New York: John Wiley & Sons, Inc., 1962.

Gilbert, Thomas F. "On the Relevance of Laboratory Investigation of Learning to Self-Instructional Programming," Teaching Machines and Programmed Learning. Ed. A. A. Lumsdaine and Robert Glaser. Washington, D.C.: National Education Association, 1960.

Glaser, Robert. "Research and Development Issues," Perspectives in Programming. Ed. Robert T. Filep. New York: The MacMillan Co., 1963.

Goldberg, Miriam. "Preface," Productive Thinking in Education. Ed. Mary Jane Aschner and Charles E. Bish. Washington,

Goldman, R. J. "The Minnesota Tests of Creative Thinking," Educational Research. VII (November 1964), pp. 3-14.

Good, Carter V., (ed.) Dictionary of Education. New York: McGraw-Hill, 1959. p. 532.

Gotkin, L. "Cognitive Development and the Issue of Individual Differences," Programmed Instruction. Vol. 3 (October 1963), pp. 1-2.

Green, Edward J. The Learning Process and Programmed Instruction. New York: Holt, Rinehart and Winston, 1962.

Greenhill, L. P., et. al. "Further Studies of the Use of Television for University Teaching," AV Communication Review, IV (Summer 1956), pp. 200-216.

Gropper, George L., "Comment on 'Sense-Impression Responses to Differing Pictorial and Verbal Stimuli,'" AV Communication Review, Vol. 4 (Spring 1966), pp. 91-93.

Gropper, George L. Learning from Visuals: The Application of Programming Principles to Visual Presentations. Pittsburgh, Pa.: American Institutes for Research, 1963 (a film report).

Gropper, George L. A Behavioral Analysis of the Role of Visuals in Instruction. Pittsburgh, Pa.: American Institutes for Research, January 1963.

Guilford, J. P. "Creativity and Our Future," The Future Implications of Creativity Research. Pasadena: A One Day Symposium Co-sponsored by Los Angeles State College and Chouinard Art Institute, J. Leonard Steinberg, Coordinator, March 10, 1962.

Haefele, John W. Creativity and Innovation. New York: Reinhold Publishing Corporation, 1962.

Hall, Edward T. The Silent Language. New York: Doubleday & Co., 1959, and Premier-Fawcett (paperback), 1961.

Hausman, Jerome. "Research on Teaching the Visual Arts," Handbook of Research on Teaching. Ed. M. L. Gage, American Education Research Association. Chicago: Rand McNally & Co., 1963.

Hayakawa, S. J. "A Look at Today's Education," San Francisco Examiner, Feb. 13, 1969.

Hazard, William R. "Goals," Art Education, Journal of the National Art Education Association, Vol. 20, No. 8 (November 1967).

Holland, J. G. Program Design and Use. Paper presented at the American Psychological Association Convention, Chicago, 1960. Student Response in Programmed Instruction. Ed. A. A. Lumsdaine. Washington, D. C.: National Academy of Sciences, National Research Council, 1961.

Jacobs, Paul, et. al. A Guide to Evaluating Self-Instruction Programs. Chicago: Holt, Rinehart and Winston, 1966, pp. 1-84.

Jefferson, Blanche. Teaching Art to Children (2nd ed.) Boston: Allyn and Bacon, Inc., 1965.

Johnson, Donald M. The Psychology of Thought and Judgment. New York: Harper, 1955.

Kassay, John. "Self-Instructional Systems," Audio-Visual Instruction. April 1966.

Kersh, B. Y. "Programming Classroom Instruction," Teaching Machines, II: Data and Directions. Ed. R. Glaser. Washington: National Education Association, 1965, pp. 321-71.

Knudsen, Estelle and Ethel Christensen. Children's Art Education. Peoria, Ill.: Charles A. Bennett Co., Inc. 1957.

Krathwohl, David R., Benjamin S. Bloom and Bertram B. Masia. Taxonomy of Educational Objectives, Handbook II: Affective Domain. New York: David McKay Company, Inc., 1964.

Logan, F. M. Growth in Art in American Schools. New York: Harper, 1955.

Lowenfeld, Victor. "Creativity: Education's Stepchild," A Source Book for Creative Thinking. Ed. Sidney J. Parnes and Harold F. Harding. New York: Charles Scribner's Sons, 1962.

Lowenfeld, Victor, and W. Lambert Brittain. Creative and Mental Growth. 4th ed. New York: The MacMillan Co., 1964.

Lumsdaine, A. A. "The Development of Teaching Machines and Programmed Self-Instruction." New Teaching Aides for the American Classroom. Office of Education, U. S. Department of Health, Education and Welfare, OE-34020. Washington, D. C.: Government Printing Office, 1960, pp. 136-169.

Lumsdaine, A. A. "Graphic Aids, Models, and Mockups as Tools for Individual and Classroom Instruction; Educational Media: A Symposium," National Academy of Sciences, National Resources Council Publication No. 789, Washington, D. C., 1960.

Lumsdaine, A. A. "Some Issues Concerning Devices and Programs for Automated Learning," Teaching Machines and Programmed Learning. Washington, D. C.: National Education Association, 1960.

May, M. A. "The Psychology of Learning from Demonstration Films," Journal of Educational Psychology. No. 37, (1946).

McDonald, F. J. "Motivation and the Communication Processes," AV Communication Review. Vol. 9 (1961), pp. 57-67.

McFee, June King. "Visual Arts: Psychological Implications of Individual Differences in the Perception-Delineation Process," Unpublished doctoral disseration, Stanford University, Paol Alto, California, 1957.

McFee, June King. Preparation for Art. San Francisco: Wadsworth Publishing Company, Inc., 1961.

Mager, Robert F. Preparing Instructional Objectives. San Francisco: Fearon Publishers, 1962.

Meier, Norman Charles. The Meier Art Tests, Examiner's Manual. Iowa City: Bureau of Educational Research and Service, State University of Iowa, 1942.

Melton, A. W. Categories of Human Learning. New York: Academic Press, 1964.

Messer, Thomas M. Modern Art, An Introductory Commentary. New York: The Solomon R. Guggenheim Foundation, 1962.

Miles, Matthew B. Innovation in Education. New York: Teachers College, Columbia University, 1964.

Oevirk, Otto G., et. al. Art Fundamentals Theory and Practice. Dubuque, Iowa: William C. Brown Company, Publishers, 1962.

Oliver, Albert I. Curriculum Improvement. A Guide to Problems, Principles, and Procedures. New York: Dodd, Mead and Co., 1965.

Pikas, Anatol. Abstraction and Concept Formation (An Interpretative Investigation into a Group of Psychological Frames of Reference). Massachusetts: Harvard University Press, 1966.

Postlethwait, Samuel N. "Teaching Tools and Techniques, An Audio-Tutorial Approach to Teaching," Pacific Speech. Vol. 1, No. 4 (1967), p. 57.

Rasmussen, Warren I. "Instructional Process and Media Integration in the Creative Arts," Instructional Process and Media Innovation. Ed. Robert A. Weisgerber. Palo Alto, California: American Institute for Research, and Chicago: Rand McNally & Co., 1960.

Resnick, L. B. "Programmed Instruction and the Teaching of Complex Intellectual Skills, Problems and Prospects," Harvard Education Review. Vol. 33 (1963), pp. 439-471.

Rokeach, Milton. The Open and Closed Mind. New York: Basic Books, Inc., 1960.

Rugg, Harold. Imagination. New York: Harper & Row, 1963.

Russel, David H. Children's Thinking. Boston: Ginn & Co., 1956.

Russel, A. Barclay. "The Relation of the Arts to Education and Society," Art Education Today. Vol. 3, 1952, p. 352.

Schimeller, James A. Art Search and Self Discovery. Scranton, Pa.: International Textbook Company, 1961.

Schramm, Wilbur (ed.). New Teaching Aids for the American Classroom. Stanford, California: Institute for Communication Research, Stanford University, 1960.

Silvern, Leonard C. Textbook in Methods of Instruction. (2nd ed.) Los Angeles: Hughes Aircraft Co., 1962, p. 44.

Smith, Carl U., and Margaret Foltz Smith. Cybernetic Principles of Learning and Educational Design. New York: Holt, Rinehart and Winston, Inc., 1966.

Sperling, G. "The Information Available in Brief Visual Presentations," Psychology (Monograph), Vol. 74, No. 11, 1960.

Stewart, Donald K. "A Learning Systems Concept as Applied to Courses in Educational Training," Unpublished paper. Madison: Articulated Instructional Media Program, University of Wisconsin, 1964.

Taylor, Calvin W., and John Holland. "Predictors of Creative Performances," Creativity: Progress and Potential. Ed. Calvin W. Taylor. New York: McGraw-Hill Co., 1964.

Thistlethwaite, Donald. "Attitudes and Structure as Factors in the Distortion of Reading," Journal of Abnormal and Social Psychology, No. 45 (1950).

Torrance, E. Paul. "Education and Creativity," Creativity: Progress and Potential. Ed. Calvin W. Taylor. New York: McGraw-Hill Co., 1964.

Torrance, E. Paul. Guiding Creative Talent. Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1962.

Torrance, E. Paul. Education and the Creative Potential. Minneapolis: The University of Minnesota Press, 1963.

U. S. Department of the Air Force. The Relative Effectiveness of an Air Force Training Device Used Intact Vs. With Isolated Parts. [by T. E. Aukes and G. B. Simon] Res. Dept. AFPTRC-TN-57-77 (ASTLA Doc. No. 131429). Lackland Air Force Base, Tex.: Air Force Personnel and Training Research Center., June 1957.

Van Piera, Lurene H. Art Teaching Guide, Hawaii. Honolulu, Hawaii: Hawaii Department of Public Instruction, 1960.

Vernon, M. D. A Further Study of Visual Perception. London: Cambridge University Press, 1952.

Vernon, M. D. "Presenting Information in Diagrams," AV Communication Review. Vol. 1 (1953), pp. 147-158.

Vernon, M. D. "The Value of Pictorial Illustrations," British Journal of Educational Psychology. Vol. 23, (1953), pp. 180-187.

Vris, Thomas. "Instructional Effect of Pictorial Illustration on the Training Manual for Skill Learning," Human Engineering Report. SDC 269-24. Special Devices Center, Port Washington, New York, 1955.

Wankelman, Willard, Philip Wigg, and Marietta Wigg. A Handbook of Arts and Crafts. Dubuque, Iowa: C. Brown Company, Publishers, 1961.

Wankelman, Willard, Karl Richards, and Marietta Wigg. Arts and Crafts for Elementary Teachers. Dubuque, Iowa: William C. Brown Company, Publishers, 1954.

Wetheimer, Max. Productive Thinking. New York: Harper, 1954.

Woodward, L. "The Effect of Immediate Feedback on Learning in Humanities in Social Science," AV Communication Review, Vol. 13 (Summer 1965).

Woodworth, R. S. "Reinforcement of Perception," American Journal Psychology. Vol. 60 (1947), pp. 119-124.

Ziekerman, J. V. "Predicting Film Learning by Pre-release Testing," AV Communications Review (Spring 1954).

Zimmerman, Wayne S. "Introduction and Overview," The Future Implications of Creative Research. Pasadena: A One Day Symposium Co-sponsored by Los Angeles State College and Choinard ARt Institute, J. Leonard Steinberg, Coordinator, March 10, 1962.

Zirbes, Laura. Spurs to Creative Teaching. New York: G. P. Putnam's Sons, 1959.

Some Important Design Texts:

Anderson, Donald M. Element of Design. New York: Holt, Rinehart and Winston, 1961.

Beam, Phillip C. The Language of Art. New York: Ronald Press Co., 1958.

Cataldo, John W. Graphic Design and Visual Communication. Scranton: International Textbook Co., 1966.

Downer, Marion. Discovering Design. New York: Lathrop, Lee and Shepard Co., 1947.

_____. The Story of Design. New York: Lathrop, Lee and Shepard Co., 1963.

Groves, Maitland E. The Art of Color and Design. New York: McGraw-Hill, 1951.

Hurwitz, Elizabeth Adams. Design: A Search for Essentials. Scranton, Pennsylvania: International Textbook Company, 1964.

Mendelowitz, Daniel M. Drawing. New York: Holt, Rinehart and Winston, Inc., 1967.

APPENDIX A

DECISIONS IN DESIGN
AN AUTO-TUTORIAL SEQUENCE

Instructions concerning the operation and use of the program:

1. PROGRAM DESCRIPTION

The users will note that the program consists of (a) a drum of fifty slides, (b) an audio-tape, and (c) a program review handbook which you are reading.

2. PROGRAM OPERATION

The audio-tape is to be threaded on the provided tape deck and advanced to the program starting point. The drum of slides is to be placed on the projector and slide #1 placed on the screen in focus. The audio-tape will indicate when the slides are to be advanced. The user will proceed with the audio-tape. If review is required, the program can be viewed a second or third time. The provided handbook will give you ample opportunity to review the material at a later time. Should you care to rest or review during the program, the tape deck can be stopped and/or reversed at any time.

3. SUGGESTED REVIEW ACTIVITIES

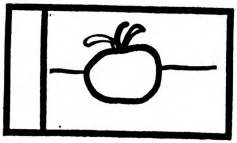
A small rectangle is provided in front of each small drawing. Should you not understand the material, place a mark there so you can later ask your instructor for

a more in-depth explanation. You are to take this booklet with you and add it to your regular course materials. Please bring it to class.

Note: The students not required to experience the auto-tutorial environment should also retain this handbook for review. After the regular lecture, an examination on this material will be announced.

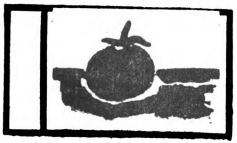
Thank you for your cooperation.

LINE



A.

COLOR



B.

TEXTURE & PATTERN

C.

VALUE

D.

SHAPE

E.

CHECK LIST

DECISION #1

THE REPRESENTATIONAL MODE

Definition:
To follow the model with some degree of accuracy.

A. Representational lines.

B. Representational color (local color)

C. Representational textures and patterns.

D. Representational values.

E. Representational shapes.

FIG. # 1

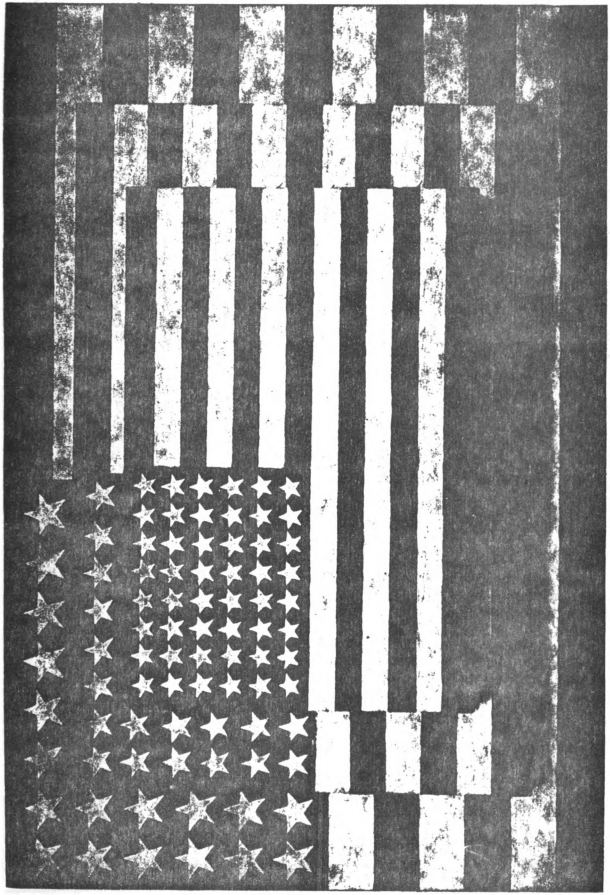


FIG. # 2

LINE

A.

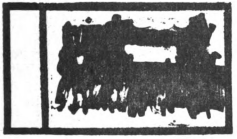
COLOR

B.

TEXTURE & PATTERN

C.

VALUE



D.

SHAPE

E.

DECISION #2

THE ABSTRACT MODE

Definition:
To change your subject matter to fit your own expressive needs.

A. Abstract lines.

B. Abstract colors.

C. Abstract texture and patterns.

D. Abstract values.

E. Abstract shapes.

CHECK LIST

FIG. # 3

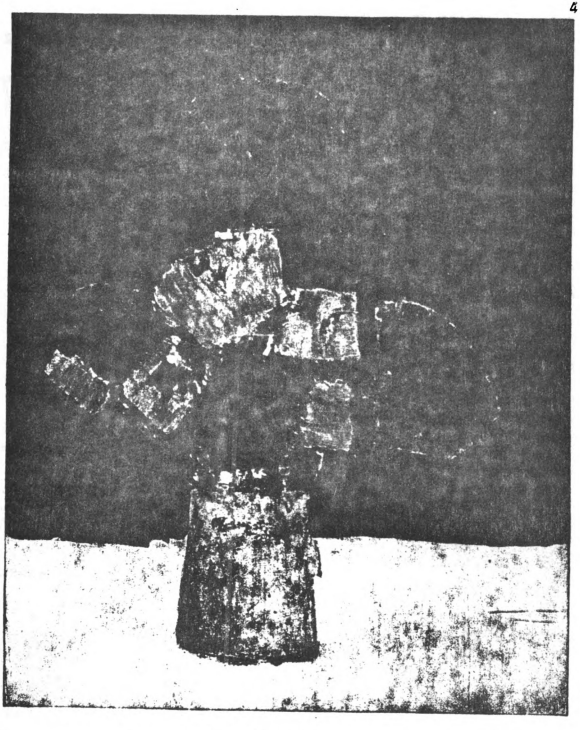
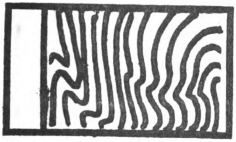


FIG. #4

LINE

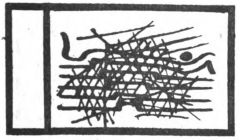


A.

COLOR

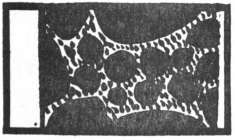
B.

TEXTURE & PATTERN



C.

VALUE



D.

SHAPE

E.

CHECK LIST

DECISION #3

THE NON-OBJECTIVE MODE

Definition:
The elements of art become the subject matter.

A. Non-objective lines.

B. Non-objective colors.

C. Non-objective texture and patterns.

D. Non-objective values.

E. Non-objective shapes.

FIG. #5

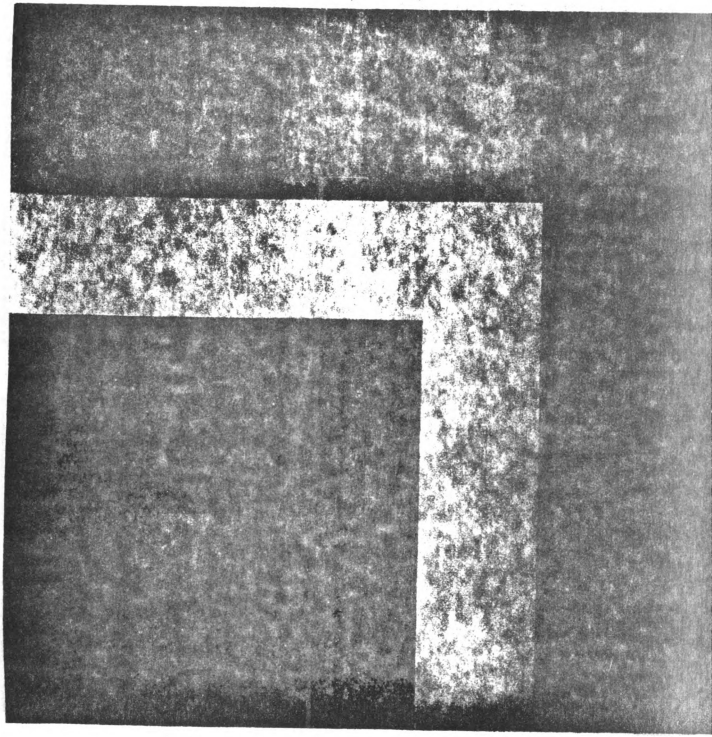
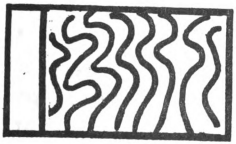


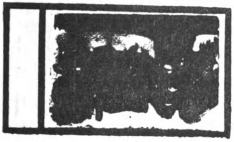
FIG. #6

LINE



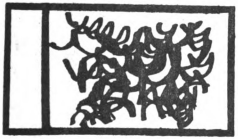
A.

COLOR



B.

TEXTURE & PATTERN

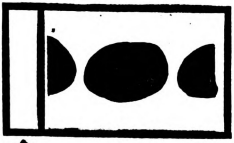


C.

VALUE

D.

SHAPE



E.

DECISION #4

THE ORGANIC MODE

Definition:
To create a work of art that contains diffused edges, flowing, continuous and curvilinear shapes.

A. Organic lines.

B. Organic colors.

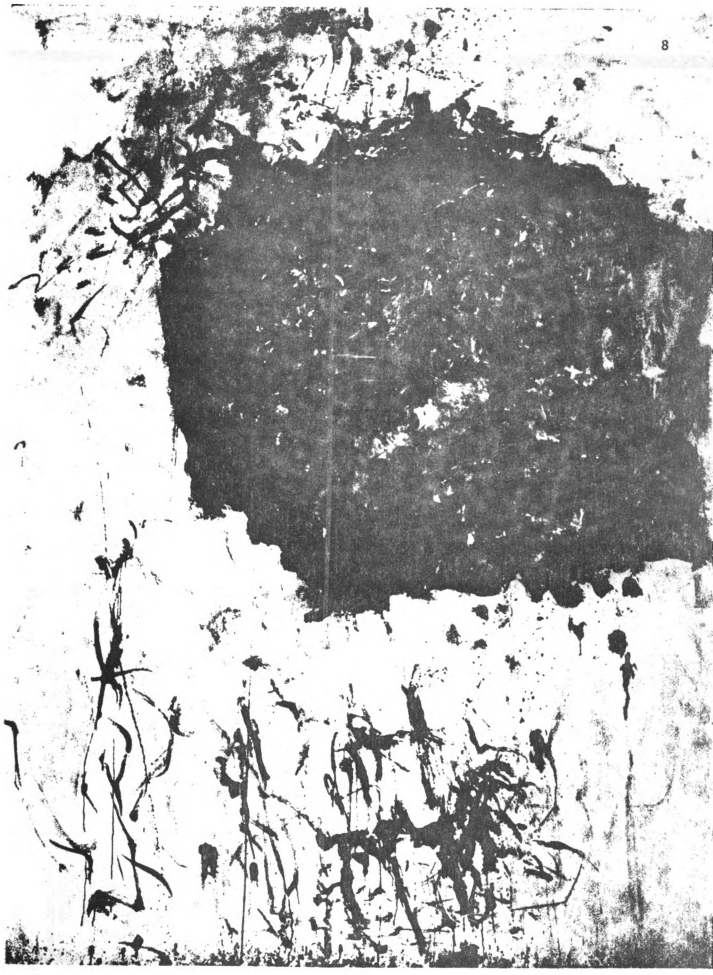
C. Organic textures and patterns.

D. Organic values.

E. Organic shapes.

CHECK LIST

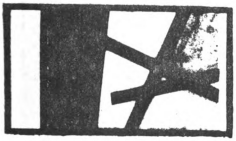
FIG. 4



LINE

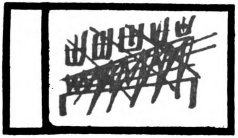
A.

COLOR



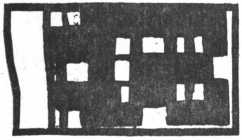
B.

TEXTURE & PATTERN



C.

VALUE



D.

SHAPE

E.

CHECK LIST

DECISION #5

THE INORGANIC MODE

Definition:
To create a work of art that contains hard edges, straight lines, and angular shapes.

A. Inorganic lines.

B. Inorganic colors.

C. Inorganic textures and patterns.

D. Inorganic values.

E. Inorganic shapes.

FIG. #9

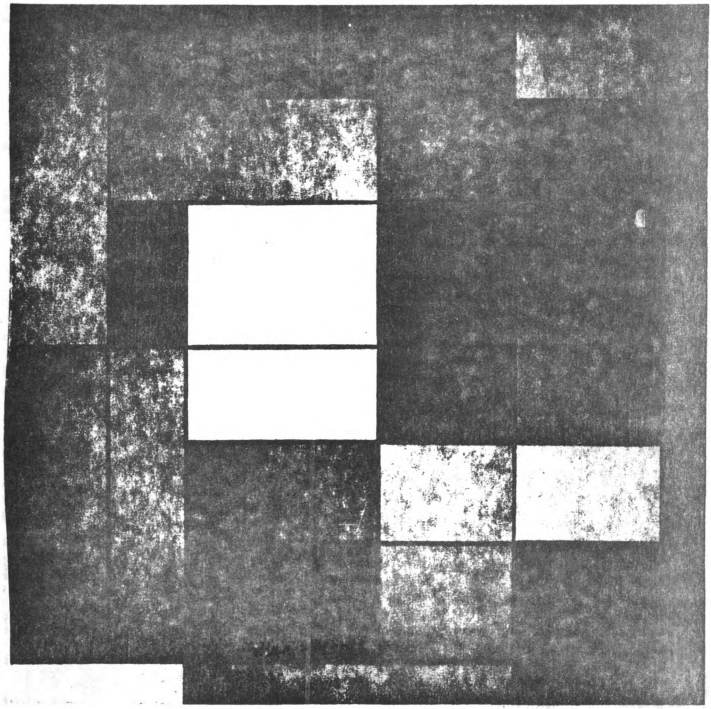
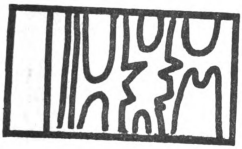


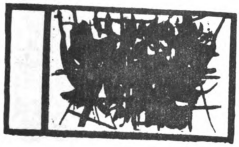
FIG. #10

LINE



A.

COLOR



B.

TEXTURE & PATTERN

C.

VALUE

D.

SHAPE

E.

CHECK LIST

DECISION #6

THE ORGANIC-INORGANIC MODE

Definition:
A carefully chosen combination of each of these modes.

A. Organic-inorganic lines.

B. Organic-inorganic colors.

C. Organic-inorganic texture and patterns.

D. Organic-inorganic values.

E. Organic-inorganic shapes.

FIG. # 11

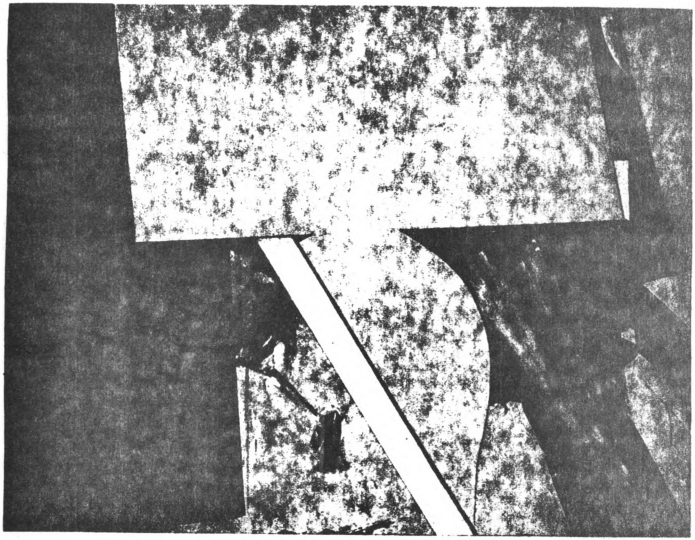
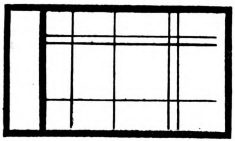


FIG. #12

LINE

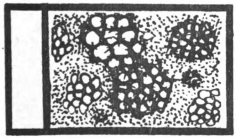


A.

COLOR

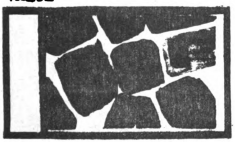
B.

TEXTURE & PATTERN



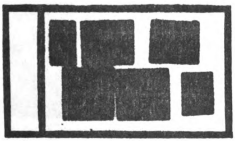
C.

VALUE



D.

SHAPE



E.

CHECK LIST

DECISION #7

TO ACCEPT THE WORKING SURFACE

Definition:
To accept the ground on which you are working and retain a degree of flatness.

A. Accepting the surface with line.

B. Accepting the surface with color.

C. Accepting the surface with texture and pattern.

D. Accepting the surface with value.

E. Accepting the surface with shape.

FIG. #13

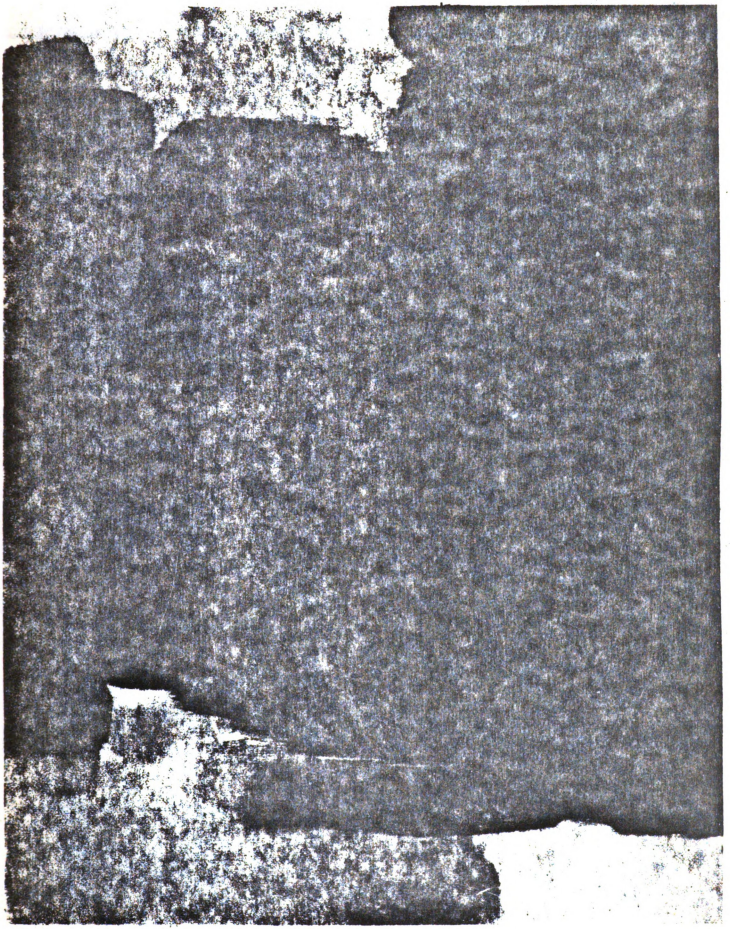
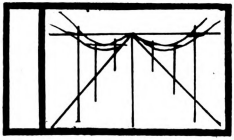


FIG. #14

LINE



A.

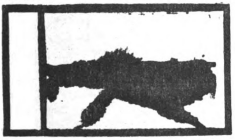
COLOR

B.

TEXTURE & PATTERN

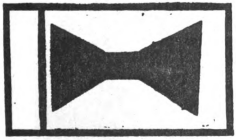
C.

VALUE



D.

SHAPE



E.

CHECK LIST

DECISION #8

TO DENY THE WORKING SURFACE

Definition:
To deny the flatness of your working surface to create a high degree of depth.

A. Denying the surface with line.

B. Denying the surface with color.

C. Denying the surface with texture and pattern.

D. Denying the surface with value.

E. Denying the surface with shape.

FIG. #15

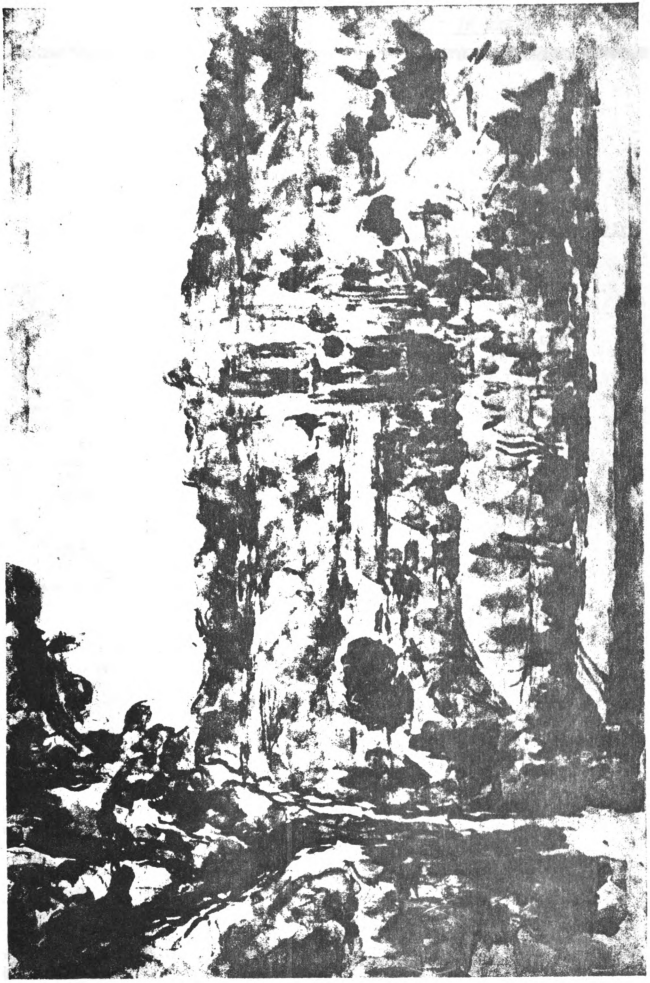
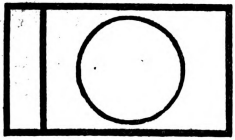


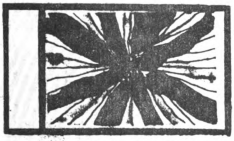
FIG.#16

LINE



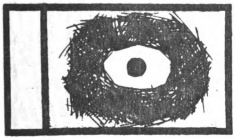
A.

COLOR



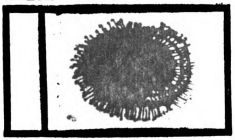
B.

TEXTURE & PATTERN



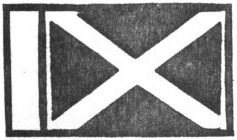
C.

VALUE



D.

SHAPE



E.

CHECK LIST

DECISION #9

THE CENTRAL OBVIOUS MODE OF BALANCE

Definition:
To arrange the elements of art so they radiate evenly from the center point of your working surface.

A. Central obvious mode of balance using line.

B. Central obvious mode of balance using color.

C. Central obvious mode of balance using texture and pattern.

D. Central obvious mode of balance using value.

E. Central obvious mode of balance using shape.

FIG. #17

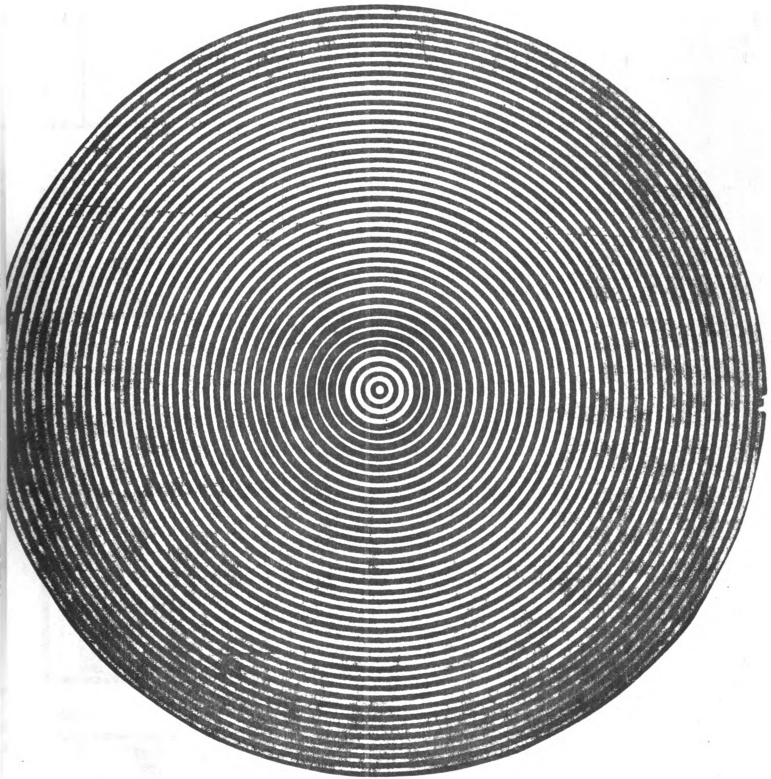
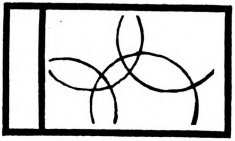


FIG. #18

LINE

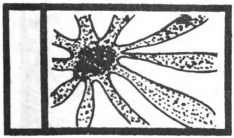


A.

COLOR

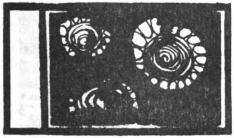
B.

TEXTURE & PATTERN



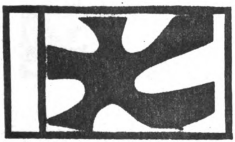
C.

VALUE



D.

SHAPE



E.

DECISION #10

THE CENTRAL OCCULT MODE OF BALANCE

Definition:
To arrange the elements of art so they radiate from an off-center point within your working surface.

A. Central occult mode of balance using line.

B. Central occult mode of balance using color.

C. Central occult mode of balance using texture and pattern.

D. Central occult mode of balance using value.

E. Central occult mode of balance using shape.

CHECK LIST

FIG. #19

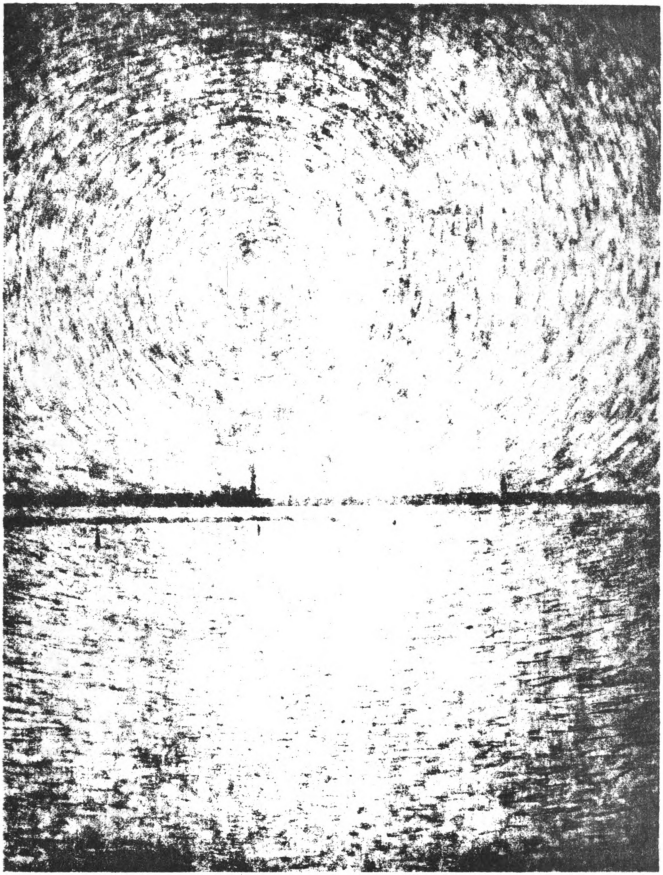
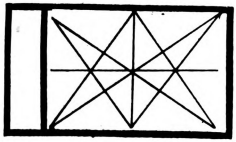


FIG. #20

LINE

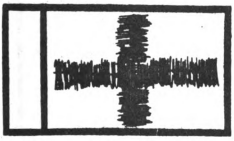


A.

COLOR

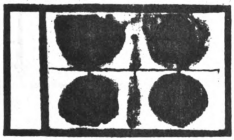
B.

TEXTURE & PATTERN



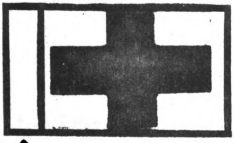
C.

VALUE



D.

SHAPE



E.

CHECK LIST

DECISION #11

THE AXIAL OBVIOUS MODE OF BALANCE

Definition:
To arrange the elements of art along the central axis of your working surface.

A. Axial obvious mode of balance using line.

B. Axial obvious mode of balance using color.

C. Axial obvious mode of balance using texture and pattern.

D. Axial obvious mode of balance using value.

E. Axial obvious mode of balance using shape.

FIG. # 21

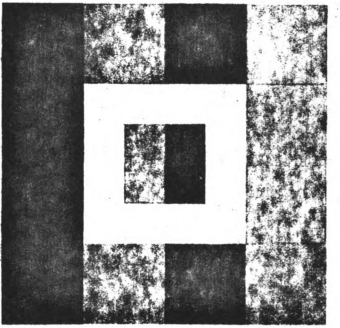
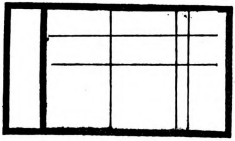


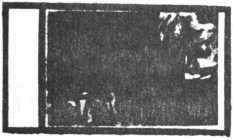
FIG. #22

LINE



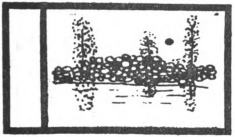
A.

COLOR



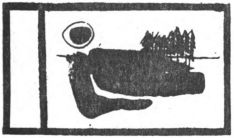
B.

TEXTURE & PATTERN



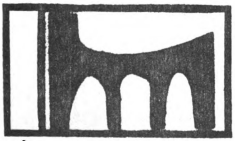
C.

VALUE



D.

SHAPE



E.

DECISION #12

THE AXIAL OCCULT MODE OF BALANCE

Definition:
To arrange the elements of art along an off-center axis of your working surface.

A. Axial occult mode of balance using line.

B. Axial occult mode of balance using color.

C. Axial occult mode of balance using texture and pattern.

D. Axial occult mode of balance using value.

E. Axial occult mode of balance using shape.

CHECK LIST

FIG. #23

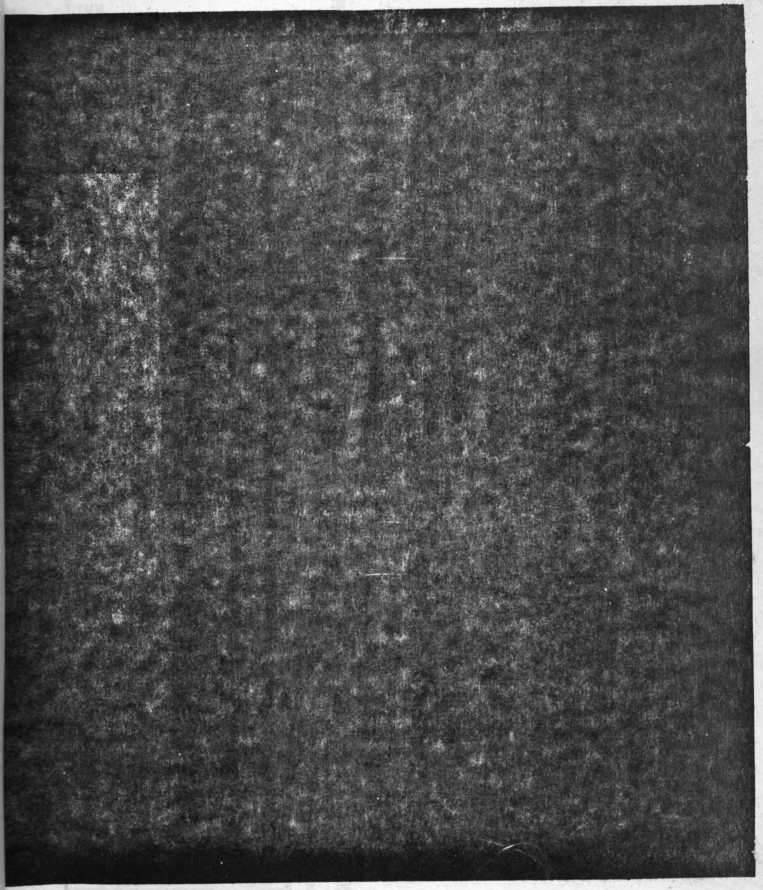
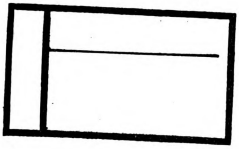


FIG. #24

LINE

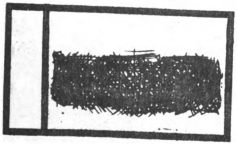


A.

COLOR

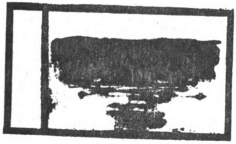
B.

TEXTURE & PATTERN



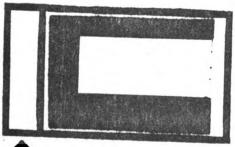
C.

VALUE



D.

SHAPE



E.

CHECK LIST

DECISION #13

THE HORIZONTAL MODE

Definition:
To arrange the elements of art horizontally.

A. The horizontal use of line.

B. The horizontal use of color.

C. The horizontal use of texture and pattern.

D. The horizontal use of value.

E. The horizontal use of shape.

FIG. #25

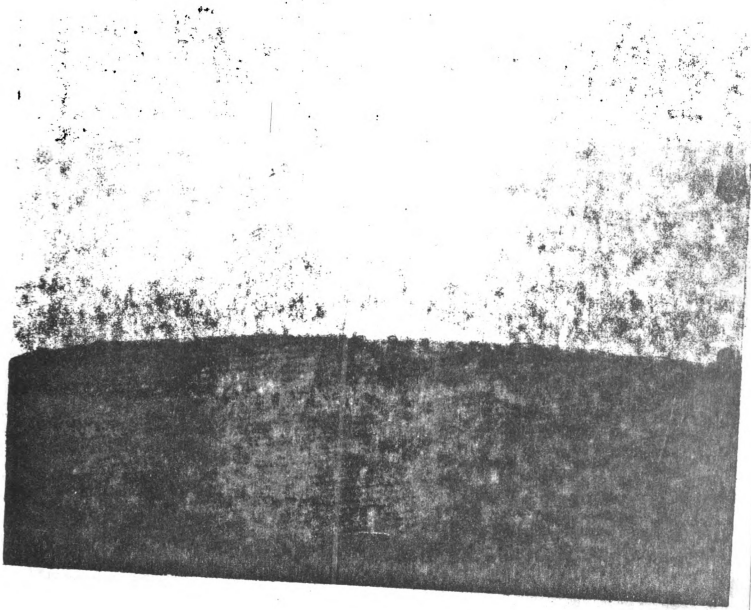
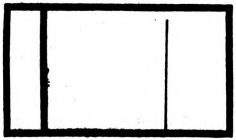


FIG. #26

LINE

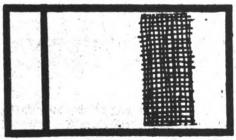


A.

COLOR

B.

TEXTURE & PATTERN



C.

VALUE

D.

SHAPE

E.

CHECK LIST

DECISION #14

THE VERTICAL MODE

Definition:
To arrange the elements of art vertically.

A. The vertical use of line.

B. The vertical use of color.

C. The vertical use of texture and pattern.

D. The vertical use of value.

E. The vertical use of shape.

FIG. #27

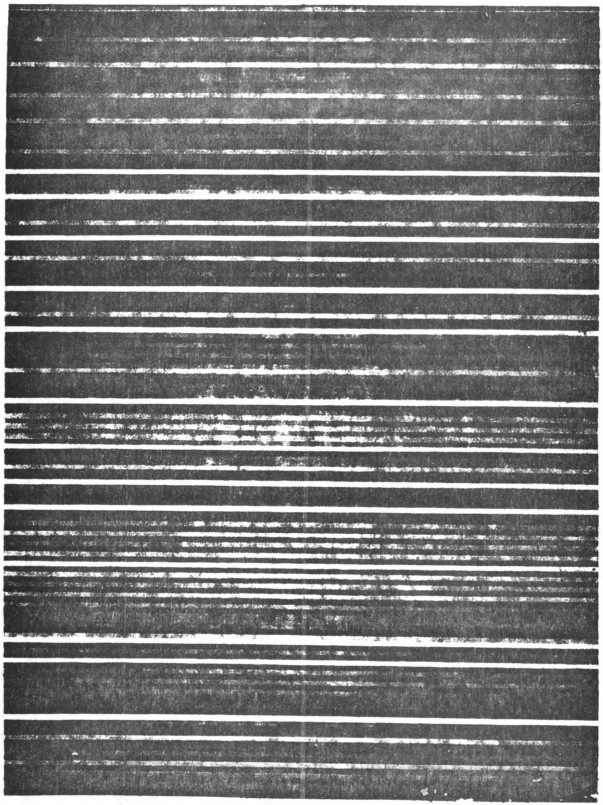
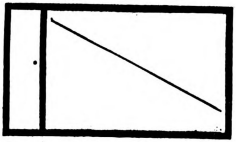


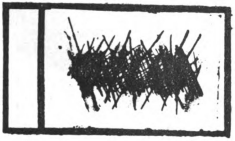
FIG. #28

LINE



A.

COLOR



B.

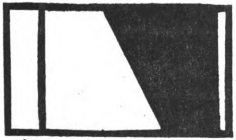
TEXTURE & PATTERN

C.

VALUE

D.

SHAPE



E.

DECISION #15

THE DIAGONAL MODE

Definition:
To arrange the elements of art diagonally.

A. The diagonal use of line.

B. The diagonal use of color.

C. The diagonal use of texture and pattern.

D. The diagonal use of value.

E. The diagonal use of shape.

CHECK LIST

FIG. #29

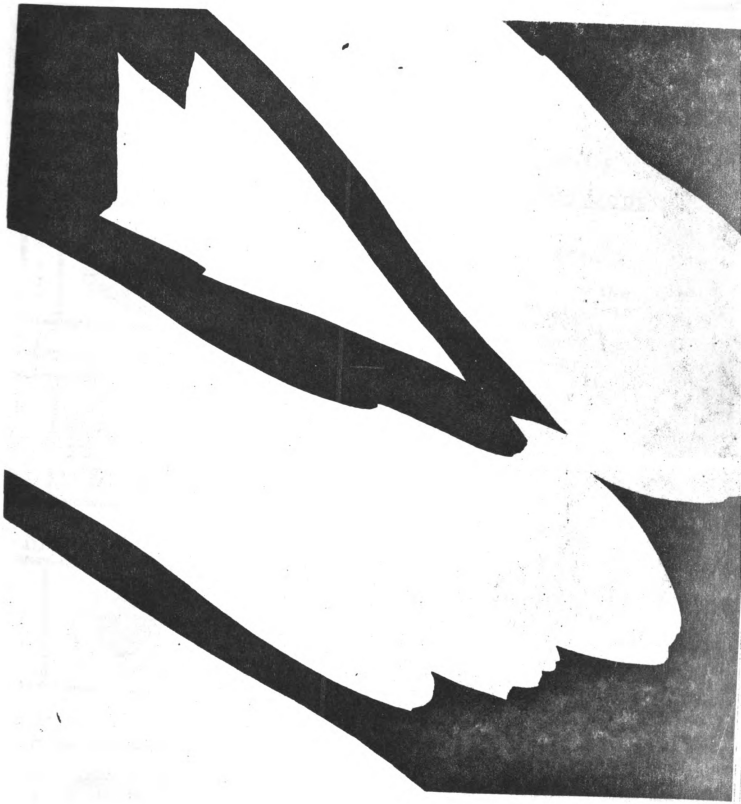
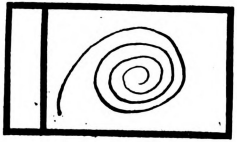


FIG. #30

LINE

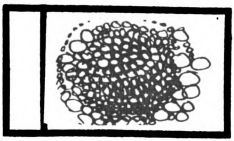


A.

COLOR

B.

TEXTURE & PATTERN

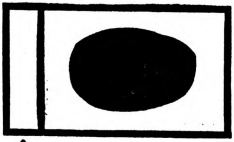


C.

VALUE

D.

SHAPE



E.

CHECK LIST

DECISION #16

THE ROTATING MODE

Definition:
To arrange the elements of art to somewhat conforming to a circular arrangement.

A. Rotating use of lines.

B. Rotating use of colors.

C. Rotating use of textures and patterns.

D. Rotating use of values.

E. Rotating use of shapes.

FIG. # 31

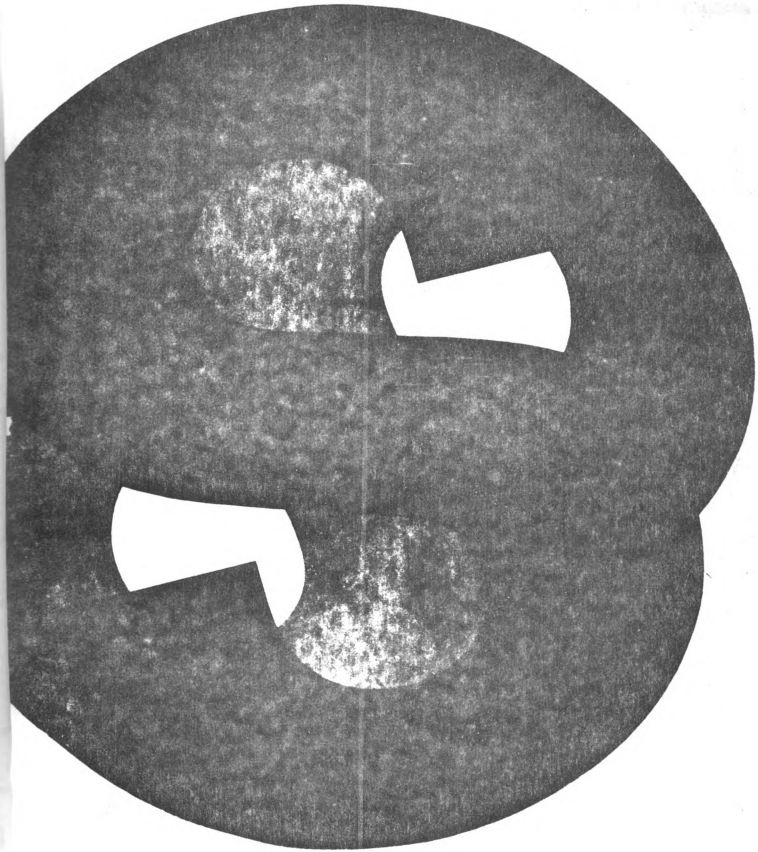
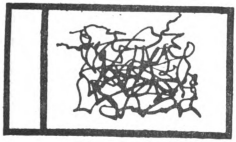


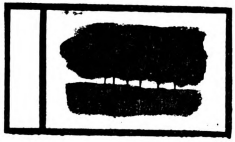
FIG. #32

LINE



A.

COLOR

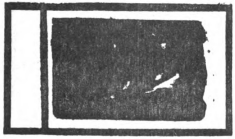


B.

TEXTURE & PATTERN

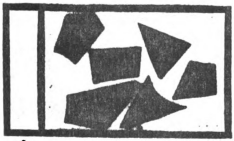
C.

VALUE



D.

SHAPE



E.

CHECK LIST

DECISION #17

ACCIDENTAL MODE

Definition:
To deny any planned ideas and create an art form out of pure involvement with a given medium.

A. Accidental use of lines.

B. Accidental use of colors.

C. Accidental use of textures and patterns.

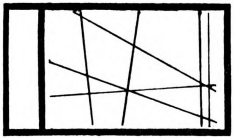
D. Accidental use of values.

E. Accidental use of shapes.

FIG. #33

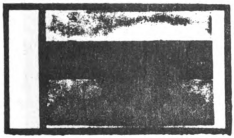
FIG. #34

LINE



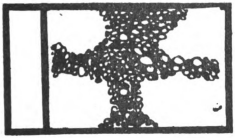
A.

COLOR



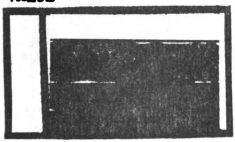
B.

TEXTURE & PATTERN



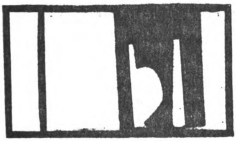
C.

VALUE



D.

SHAPE



E.

DECISION #18

BLEEDING FORMS

Definition:
To create ideas which go off the format.

A. Bleeding lines.

B. Bleeding colors.

C. Bleeding textures and patterns.

D. Bleeding values.

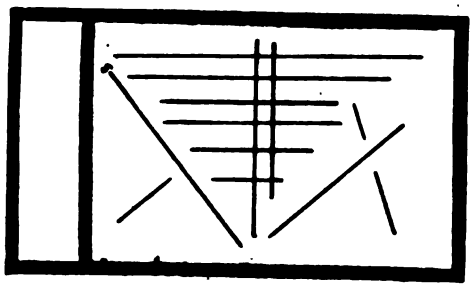
E. Bleeding shapes.

CHECK LIST

FIG. # 35

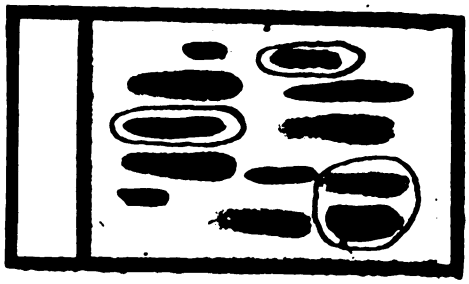
FIG. #36

LINE



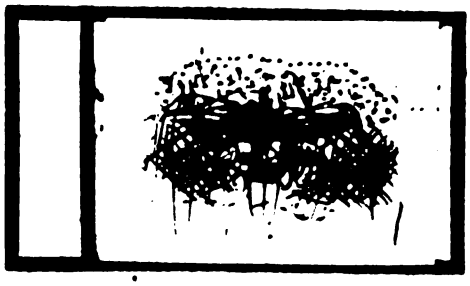
A.

COLOR



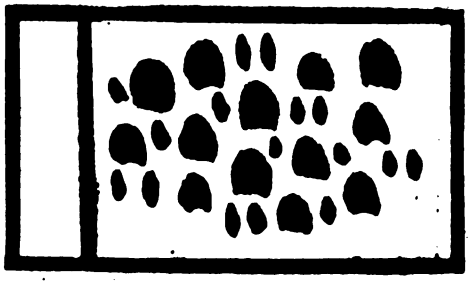
B.

TEXTURE & PATTERN



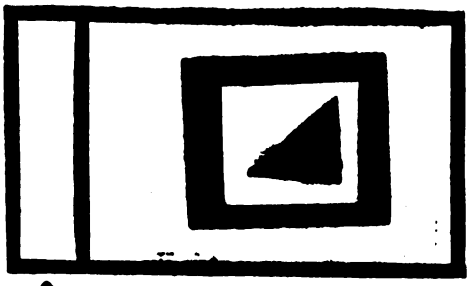
C.

VALUE



D.

SHAPE



E.

CHECK LIST

DECISION #19

FLOATING FORMS

Definition:
To create ideas which seem to be suspended or free from other forms.

A. Floating lines.

B. Floating colors.

C. Floating textures and patterns.

D. Floating values.

E. Floating shapes.

FIG. #37

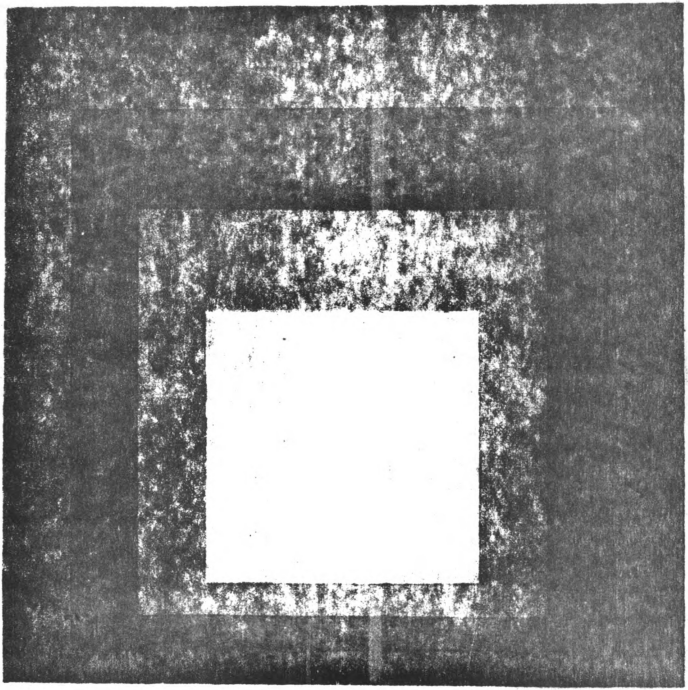
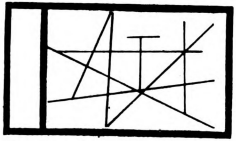


FIG. #38

LINE

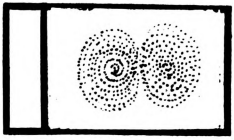


A.

COLOR

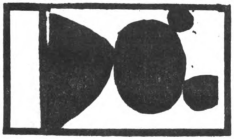
B.

TEXTURE & PATTERN



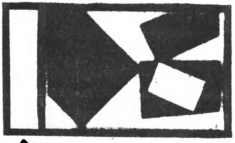
C.

VALUE



D.

SHAPE



E.

CHECK LIST

DECISION #20

CONNECTING FORMS

Definition:
To create ideas which intentionally touch one another.

A. Connecting lines.

B. Connecting colors.

C. Connecting textures and patterns.

D. Connecting values.

E. Connecting shapes.

FIG. #29

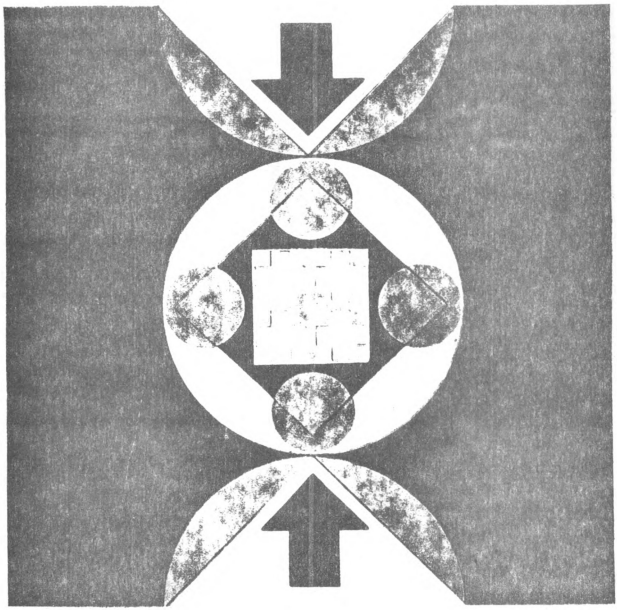
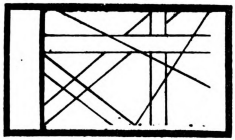


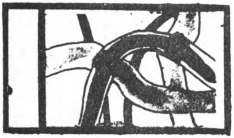
FIG. #40

LINE



A.

COLOR

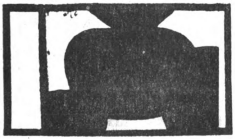


B.

TEXTURE & PATTERN

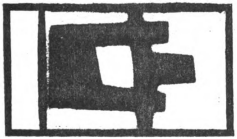
C.

VALUE



D.

SHAPE



E.

DECISION #21

OVERLAPPING FORMS

Definition:
To create ideas which lay in front of each other.

A. Overlapping lines.

B. Overlapping colors.

C. Overlapping textures and patterns.

D. Overlapping values.

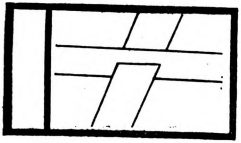
E. Overlapping shapes.

CHECK LIST

FIG. #41

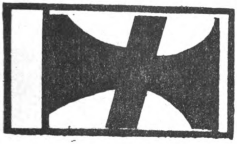
FIG. #42

LINE



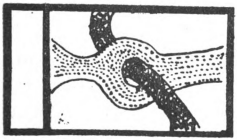
A.

COLOR



B.

TEXTURE & PATTERN

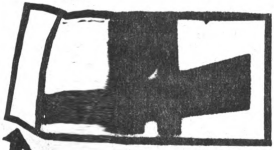


C.

VALUE

D.

SHAPE



E.

CHECK LIST

DECISION #22

PENETRATING FORMS

Definition:
To create ideas which flow into one another.

A. Penetrating lines.

B. Penetrating colors.

C. Penetrating textures and patterns.

D. Penetrating values.

E. Penetrating shapes.

FIG. #43

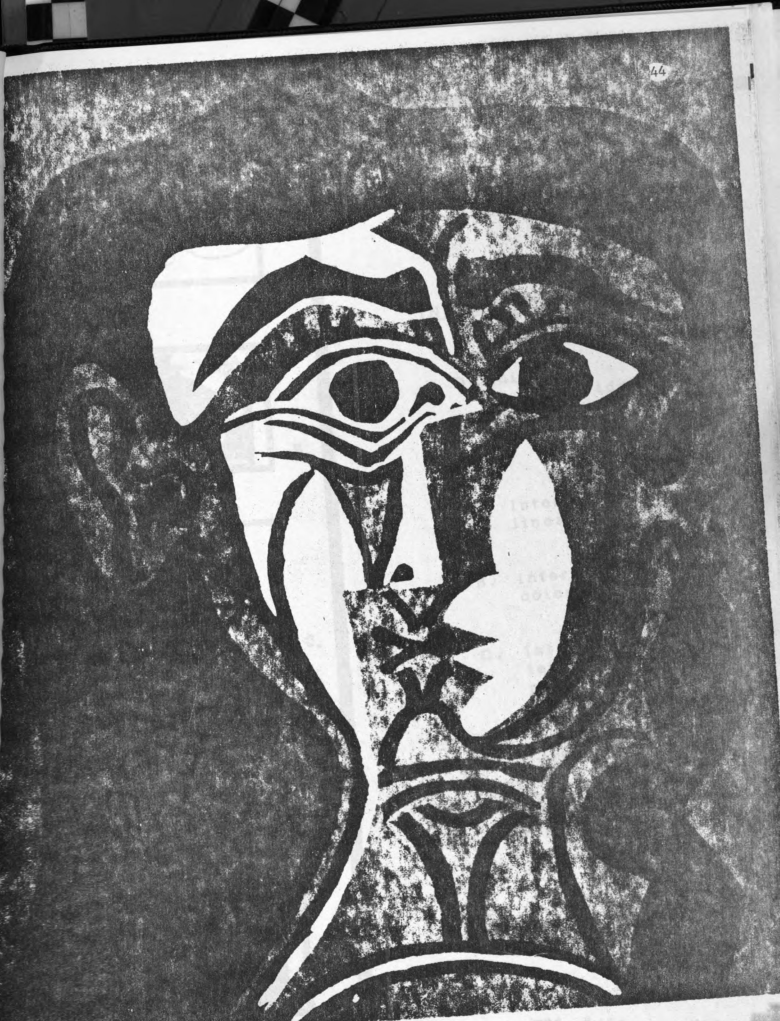
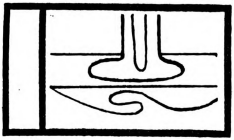


FIG. #44

LINE

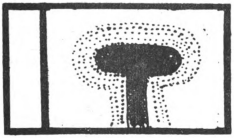


A.

COLOR

B.

TEXTURE & PATTERN

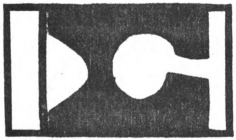


C.

VALUE

D.

SHAPE



E.

CHECK LIST

DECISION #23

INTERLOCKING FORMS

Definition:
To create ideas which intertwine with one another.

A. Interlocking lines.

B. Interlocking colors.

C. Interlocking textures and patterns.

D. Interlocking values.

E. Interlocking shapes.

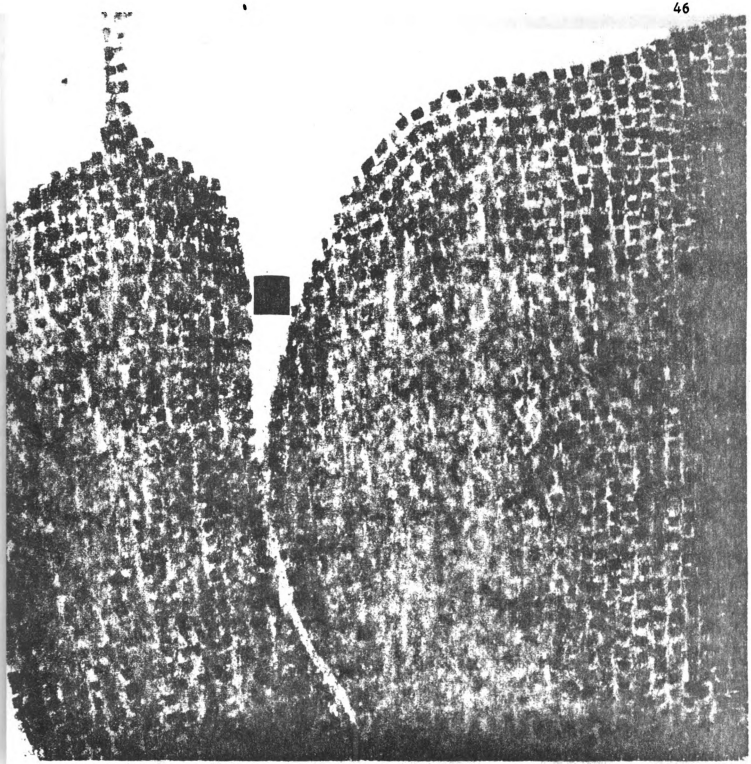
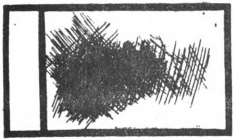


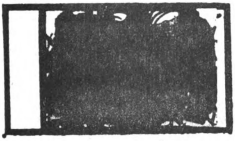
FIG. #46

LINE



A.

COLOR



B.

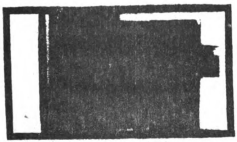
TEXTURE & PATTERN

C.

VALUE

D.

SHAPE



E.

DECISION #24

GRADATION OF FORMS

Definition:
To gradually change from one idea to the next.

A. Gradation of lines.

B. Gradation of colors.

C. Gradation of textures and patterns.

D. Gradation of values.

E. Gradation of shapes.

CHECK LIST

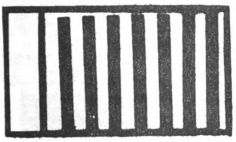
FIG. # 47

FIG #48

LINE

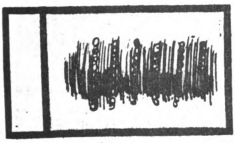
A.

COLOR



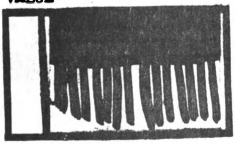
B.

TEXTURE & PATTERN



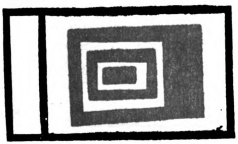
C.

VALUE



D.

SHAPE



E.

CHECK LIST.

DECISION #25

ALTERNATION OF FORMS

Definition:
To change from one idea to another quickly.

A. Alternation of lines.

B. Alternation of colors.

C. Alternation of textures and patterns.

D. Alternation of values.

E. Alternation of shapes.

FIG. #49

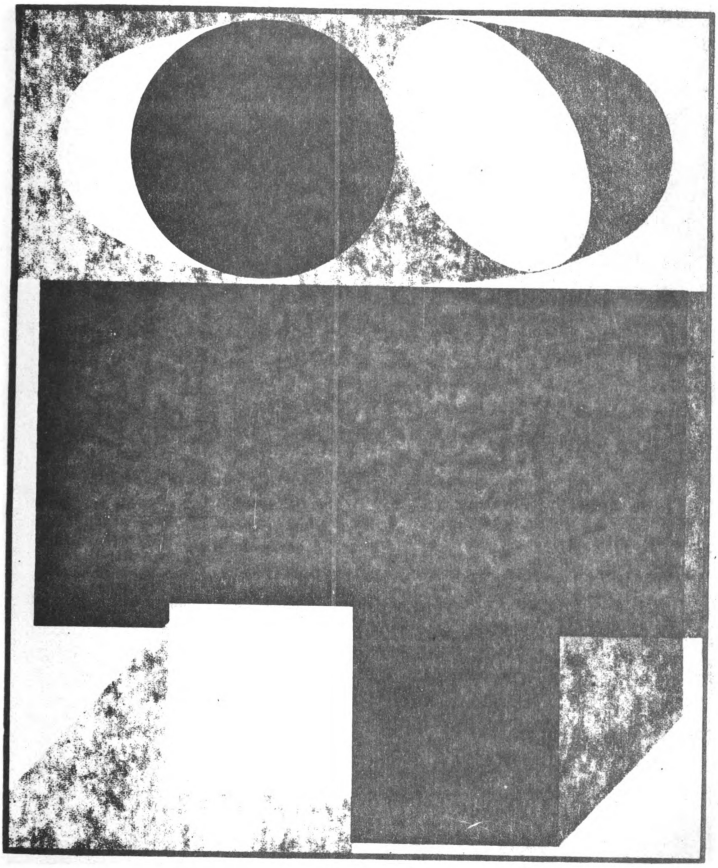


FIG. #50

APPENDIX B

DESIGNS USED IN THE STUDY

The designs listed below are those used in the auto-tutorial program. Those that have two exposures were used a second time on the post-test. Those that are marked with a single exposure were only used on the post-test.

Slide No.	Artist	Date	No. of Exposures
1	Bridgette Riley	1968	1
2	Keith Knowland	1965	1
3	Robert Goodnough	1966	1
4	Adelle Feinberg	1955	2
5	Martin Davis	1966	2
6	Kenneth Noland	1963	2
7	Joseph Turner	1820	2
8	Hans Hoffman	1964	1
9	Robert Motherwell	1963	2
10	Piet Mondrian	1920	2
11	George Ortman	1964	2
12	Ellsworth Kelly	1967	2
13	Jasper Johns	1968	2
14	Jackson Pollock	1960	2
15	Franz Kupka	1913	2
16	Alex Katz	1966	2
17	Bridgette Riley	1968	1
18	Ad Rienhardt	1962	2

Slide No.	Artist	Date	No. of Exposures
19	Joan Mitchell	1963	2
20	Keith Knowland	1962	1
21	Arthur Dove	1948	1
22	Phillip Guston	1959	1
23	Franz Kline	1962	1
24	Joseph Alfus	1949	2
25	Kenojuak	1959	2
26	Paul Cezanne	1906	2
27	Nathan Sieger	1968	1
28	Nicholas DeStael	1953	2
29	Mark Rothko	1959	1
30	Keith Knowland	1960	2
31	Larry Rivers	1963	1
32	Jackson Pollock	1953	1
33	Puablo Picasso	1937	2
34	Helen Frankenthaler	1967	1
35	Jack Youngerman	1965	2
36	Albert Vasarely	1966	2
37	Robert Graves	1950	2
38	Barnett Newman	1963	2
39	Bridgett Riley	1967	1
40	Robert Davies	1949	1
41	Edward Franscotti	1957	1
42	Bridgette Riley	1967	1
43	Richard Auskiewicz	1968	2
44	Keith Knowland	1965	2
45	Joseph Albers	1961	1

Slide No.	Artist	Date	No. of Exposures
46	Larry Poons	1967	1
47	Ad Rienhardt	1964	2
48	Al Held	1965	1
49	Phillip Guston	1963	1
50	Robert Graves	1960	1

APPENDIX C

SCRIPT

FOR

DECISIONS ON DESIGN

An auto-tutorial sequence on the basic principles of design.

Tape deck and projector "on."

Introduction

The following series of fifty slides attempts to illustrate twenty-five principles of design. The illustrations in the booklet provided are the same as the material you will be covering in this slide program. May I suggest that you retain the booklet for review? Use it to note any difficult material you may wish to discuss in class.

Each basic decision is handled in the same manner. There are two pages of material for each basic principle. On the first page is a brief definition of the principle and five small drawings. The drawings attempt to demonstrate the use of the basic principle with line, color, texture and pattern, value and shape. Because of the printing process, the area of color cannot be covered in the booklet but will be carefully noted in the slides. Note that there is a small rectangle next to each small drawing. This is for making notations of any difficult material you would like to review or inquire about in class.

A second page of each unit offers an illustration or example of modern painting which dramatically shows a manipulation or use of the basic principle being discussed. Students are advised that the best illustration that could be found was used. Many others might have done as well. It is not the intention of the program to formalize design, but rather to give some possible solutions created by twentieth century artists. The artist's name, picture title, and date are omitted, since this would act as a distraction to the topic at hand.

As you listen to the tape, look carefully at the illustrations. Each one had to be created by using the elements of art, line, color, texture and pattern, value and shape. Different combinations of these elements can be seen in each example. Our major concern is identifying the twenty-five basic decisions which designers can make while creating objects of art.

Let us begin the program:

You should have slide #1 (the representational mode) on the screen. When you hear the tone* it is time to advance to the next slide. You will know by each description whether or not you are looking at the proper slide.

Decision #1 - The representational mode.

To follow the model with some degree of accuracy, let us look carefully at the first slide. Each of the twenty-five decisions will have a slide much like this one. Note the five small pictures on the left of the slide

where you will see five different ways of looking at the representational mode, using line, color, texture-pattern, value and shape.

The term "value" means the amount of white, black or grey in the design. To the right you will see a list--A through E. This is a list of titles for the five small diagrams. Remember, there are countless ways in which to explain each of these ideas. Obviously, an apple can be created with line, color, texture and pattern, value and shape. If a pattern is designed directly after the object, the designer has chosen to use the representational mode.

Slide Change

Here, as in each twenty-five decisions, is an example chosen from the world of fine arts to show you one way in which a designer used the decision being discussed. Here you see three flags done in the representational mode.

Slide Change

Decision #2 - The abstract mode.

Note the five drawings carefully; and read the material on the left. Remember A, B, C, D, and E are titles for the small diagrams. Remember, too, that they are only examples. You may think of a better way to express in a design the same ideas.

Slide Change

This vase of flowers doesn't follow an exact model, but is changed by using line, color, texture and pattern, value and shape, to fit the expressive needs of the designer.

Slide Change

Decision #3 - The non-objective mode.

Line, color, texture and pattern, value and shape become the subject matter.

Slide Change

This series of color shapes must be appreciated as things in themselves. There is no subject matter at all.

Slide Change

Decision #4 - The Organic Mode.

To create a work of art that contains diffused edges, flowing, continuous and curvilinear shapes. Remember to view the small diagrams carefully.

Slide Change

Note this design. It appears to writhe with motion... it might be growing...curving lines...soft edges, rounded forms.

Slide Change

Decision #5 - The Inorganic Mode.

To create a work of art that contains hard edges, straight lines, and angular shapes.

Slide Change

Note the hard straight lines. Is this a non-objective design? (You better believe it!) As you can see, each pair of slides builds on the next to make an uncountable number of possible combinations.

You have twenty more possible decisions to consider. Remember, you are responsible only for knowing the basic idea contained in each pair of slides. As you review the booklet and begin to look at the world around you, we hope these twenty-five concepts will give you a designer's eye, or possibly to become an expert manipulator of design in your chosen area of art or craft interest.

Slide Change

Decision #6 - The Organic-Inorganic Mode.

Slide Change

Note how the designer combined soft and hard elements. Some areas seem to writhe with complex activity, while others are hard and flat.

Slide Change

Decision #7 - To Accept the Working Surface

I believe it is time to completely fade out all verbal description. A designer uses his eyes before his hands. Look carefully at each succeeding pair of slides. Take your time. Review if you wish.

Turn off the tape deck and finish the program.

- - - - - -

Turn tape deck on.

Well, how did you fare? Remember, you can review if you feel one exposure is not enough. You have, and we think you realize it, been a designer with your eyes all along. We hope that these visual concepts help you in learning how to

look more keenly at works of art in the world around you. These concepts can help you determine a direction for your creative activities.

Take your booklet home. Sorry about the lack of color, it would have been too expensive since it requires a four-plate color process. As you take the time to review the booklet, remember to make notations of items for class discussion.

Rewind the tape.

Thanks for being a participant in this experiment.

APPENDIX D

DECISIONS IN DESIGN

Examination:

The following examination is made up of multiple-choice questions and true and false questions. Please mark your answer sheet according to the following instructions:

(1) The multiple choice questions have four possibilities. Choose the answer which most nearly fits the slide example. 1, 2, 3, or 4.

(2) The true-false questions deal directly with the slide example. Column 1 is for true answers, Column 2 for false answers.

The slides will be held on the screen for 30 seconds. This unit, "Decisions in Design," is an experiment conducted by your instructor in an effort to make some initial improvements in this course. The final results will not be part of your grade. We greatly appreciate your individual efforts in making this investigation possible.

DECISIONS IN DESIGN

"Examination"

1. This example best demonstrates the use of one of the following decisions:

    1. vertical forms
    2. central obvious balance
    3. axial occult balance
    4. horizontal forms

2. Accepting the working surface is an essential part of this design:

    1. true
    2. false

3. Bleeding forms are an essential part of this design:

    1. true
    2. false

4. This example best demonstrates the use of one of the following decisions:

    1. denying the working surface
    2. connecting forms
    3. overlapping forms
    4. abstract mode

5. This example best demonstrates the use of one of the following decisions:

    1. vertical mode
    2. penetrating forms
    3. horizontal mode
    4. connecting forms

6. This example best demonstrates the use of one of the following decisions:

    1. representational mode
    2. horizontal mode
    3. alteration of forms
    4. vertical mode

7. This example best demonstrates the use of one of the following decisions:

    1. central occult balance
    2. axial obvious balance
    3. overlapping forms
    4. floating forms

8. This example best demonstrates the use of one of the following decisions:

   1. representational mode
   2. inorganic mode
   3. non-objective mode
   4. abstract mode

9. This example best demonstrates the use of one of the following decisions:

   1. combination organic
   2. connecting forms
   3. organic mode
   4. inorganic mode

10. This example best demonstrates the use of one of the following decisions:

    1. floating forms
    2. organic mode
    3. diagonal mode
    4. inorganic mode

11. The abstract mode is an essential part of this design.

    1. true
    2. false

12. This example best demonstrates the use of one of the following decisions:

    1. accidental mode
    2. inorganic mode
    3. rotating mode
    4. accepting the working surface

13. This example best demonstrates the use of one of the following decisions:

    1. representational mode
    2. abstract mode
    3. gradation of forms
    4. denying the working surface

14. This example best demonstrates the use of one of the following decisions:

    1. diagonal mode
    2. overlapping forms
    3. inorganic mode
    4. accidental mode

15. The non-objective mode is an essential part of this design.

    1. true
    2. false

16. This example best demonstrates the use of one of the following decisions:

    1. central obvious balance
    2. overlapping forms
    3. penetrating forms
    4. interlocking forms

17. Axial obvious balance is an essential part of this design.

    1. true
    2. false

18. This example best demonstrates the use of one of the following decisions:

    1. denying the working surface
    2. accidental forms
    3. axial occult balance
    4. axial obvious balance

19. This example best demonstrates the use of one of the following decisions:

    1. inorganic mode
    2. organic mode
    3. axial obvious balance
    4. vertical mode.

20. The combination organic-inorganic mode is an essential part of this design:

    1. true
    2. false

21. Penetrating forms are not essential part of this design.

    1. true
    2. false

22. The gradation is an essential part of this design.

    1. true
    2. false

23. The inorganic mode is an essential part of this design.

    1. true
    2. false

24. This example best demonstrates the use of one of the following decisions:

    1. accidental mode
    2. combination of organic-inorganic modes
    3. floating forms
    4. alternating forms

25. Central occult balance is an essential part of this design.

    1. true
    2. false

26. This example best demonstrates the use of one of the following decisions:

    1. denying the working surface
    2. penetrating forms
    3. accepting the working surface
    4. interlocking forms

27. Connecting forms are an essential part of this design.

    1. true
    2. false

28. This example best demonstrates the use of one of the following decisions:

    1. axial obvious balance
    2. rotating form
    3. alternation of form
    4. abstract

29. The vertical mode is an essential part of this design.

    1. true
    2. false

30. This example best demonstrates the use of one of the following decisions:

    1. bleeding forms
    2. abstract mode
    3. representational mode
    4. connecting forms

31. The abstract mode is an essential part of this design.

    1. true
    2. false

32. The horizontal mode is an essential part of this design.

    1. true
    2. false

33. This example best demonstrates the use of one of the following decisions:

    1. penetrating forms
    2. horizontal mode
    3. bleeding forms
    4. diagonal mode

34. Accepting the working surface is an essential part of this design.

    1. true
    2. false

35. Interlocking forms are not an essential part of this design.

    1. true
    2. false

36. This example best demonstrates the use of one of the following decisions:

    1 gradation of forms
    2. diagonal mode
    3. vertical mode
    4. alternation of forms

37. This example best demonstrates the use of one of the following decisions:

    1. accidental mode
    2. accepting the working surface
    3. overlapping mode
    4. denying the working surface

38. This example best demonstrates the use of one of the following decisions:

    1. gradation
    2. penetrating forms
    3. interlocking forms
    4. alternation of forms

39. The inorganic mode is an essential part of this design.

    1. true
    2. false

40. The vertical mode is an essential part of this design.

    1. true
    2. false

41. Overlapping forms are not an essential part of this design.

    1. true
    2. false

42. The alternation of forms is not an essential part of this design.

    1. true
    2. false

43. This example best demonstrates the use of one of the following decisions:

    1. interlocking forms
    2. representational mode
    3. inorganic mode
    4. central occult balance

44. This example best demonstrates the use of one of the following decisions:

    1. inorganic mode
    2. diagonal mode
    3. gradation of forms
    4. vertical mode

45. Axial obvious balance is an essential part of this design.

    1. true
    2. false

46. Floating forms are an essential part of this design.

    1. true
    2. false

47. This example best demonstrates the use of one of the following decisions:

    1. interlocking forms
    2. floating forms
    3. axial occult balance
    4. central obvious balance

48. The rotating mode is an essential part of this design.

    1. true
    2. false

49. Axial occult balance is an essential part of this design.

    1. true
    2. false

50. The horizontal mode is an essential part of this design.

    1. true
    2. false

APPENDIX E

PERSONAL INVENTORY

TRA 140

B.M.M. - W.D.Y. Winter 1970

Your Name: _____

Student No.: _____

Campus Phone No.: _____

Campus Address: _____

Age: _____ Sex: M_____ F _____

Home Town: _____

High School(s) Attended:

1. _____

2. _____

3. _____

Approximate No. of Students in High School _____

Level at Michigan State (check one)

Freshman ____

Sophomore____

Junior _____

Senior _____

Graduate ____

Other _____

Your major or contempated major at M.S.U. Major _____

TRA 140

Your Art and Design Background (check all appropriate)

1. Grade School _____
2. Junior High _____
3. Senior High _____
4. Summer Classes _____
5. Summer Camp _____
6. Junior College _____
7. Art School _____
8. M.S.U. _____
9. Other University _____
10. Other _____

What are your major academic interests?

1. _____
2. _____

What are your secondary academic interests?

1. _____
2. _____

What Career or Profession are you preparing for?

Why are you taking Design: Matrix for Living?

TRA 140

What do you think the study of design is all about?

What have you heard about TRA 140?

What is your present attitude toward the study of design?

APPENDIX F

Would you consider the auto-tutorial program, Decisions in Design, a valid method of teaching basic design?

Please circle: Yes No

Would you say that it was an enjoyable learning experience?

Yes No

Do you feel that other programs of this nature would improve on the basic course, TRA 140?

Yes No

Comments, if any:

APPENDIX G

SCHEDULE FOR INSTRUCTIONAL SEQUENCING AND TESTING

January	Monday	Tuesday	Wednesday	Thursday	Friday	Evaluation
Control Groups 50 students+	Lecture 1 hour		Review 1 hour or less		Post-Test 1 hour	Testing Final Grade Questionnaire
Experimental Group 50 students+	Self-Instructional Program 8 a.m.-9 p.m*	Self-Instructional Program 8 a.m.-9 p.m*			Post-Test 1 hour	Testing Final Grade Questionnaire

* The experimental group of 50 persons will be scheduled through a carrel-learning environment at 133 Erickson Hall. The alphabetical arrangement will keep scheduling problems to a minimum.

+ Random selection used in determining the make-up of both groups.