A STUDY TO DETERMINE THE EFFECT OF INDUSTRIAL ARTS EXPERIENCE ON THE ATTITUDE CHANGES OF UNIVERSITY FRESHMEN

DISSERTATION

Presented to the Graduate Council of the North Texas State University in Partial Fulfillment of the Requirements

For the Degree of

DOCTOR OF EDUCATION

By

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The problem of this study was to determine the effect of industrial arts experiences on changing the attitudes of North Texas State University freshmen toward industrial arts generally and toward specific curriculum areas in industrial arts.

The purposes of this study were threefold: The first was to determine the effect of the industrial arts curriculum on the attitudes of university freshmen toward industrial arts and specific curriculum areas in industrial arts. The second was to determine the degree of attitude difference between industrial arts majors and non-industrial arts majors. The third was to determine if an attitude difference exists in students who were enrolled in industrial arts in high school as opposed to those who received no instruction in industrial arts in the secondary school.

For the purpose of this study the content was arranged into five chapters. The first chapter included an introduction, statement of the problem, purpose of the study, hypotheses, background and significance of the study, definition of terms, basic assumptions, and limitations. The
second chapter was a review of the literature while Chapter III was concerned with methods and procedures, description of the sample, the instrument, procedures for collecting data, and procedures for analysis of the data. The fourth chapter contained an analysis of the data with the statistical treatment presented in tabular form and Chapter V was a summary of the study and presents the findings, conclusions, and recommendations.

The study involved 118 freshman students who graduated from a secondary school in the spring of 1970; entered classes at North Texas State University in the fall of 1970; were enrolled in graphic arts, engineering drawing, woodworking, power mechanics, and metalworking; and were not previously enrolled in a college or university.

The technique employed in generating data was a "Semantic Differential." The "Semantic Differential" is a rating scale which utilizes a concept measured by several criteria. The criterion is a pair of polar adjectives located at the end of a continuum that is separated in seven equal parts. There are no standard concepts or criterion scales but for the purpose of this study the concepts are industrial arts, woodworking, metalworking, engineering drawing, graphics, and power mechanics.

The statistical treatment used in testing the hypotheses was the t test of difference between means and the .05 level was the level of significance upon which the hypothesis was accepted or rejected.
As a result of this study it was concluded that exposure to the curriculum areas of woodworking, engineering drawing, graphic arts, power mechanics, does not necessarily induce an attitude change toward these particular curriculum areas. It was concluded that sex, major field of concentration, and enrollment in a secondary industrial arts program has little effect upon the attitude change toward the concept industrial arts. It was also concluded, however, that exposure to a metalworking course did produce a change in attitude toward the concept of metalworking.

Based upon the findings and conclusions of this study it was recommended that an investigation be made of the specific curriculum areas of industrial arts. It was also recommended that there be special classes for those students in specific curriculum areas who are females and for those students who had no secondary industrial arts.
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# TABLE OF CONTENTS

**LIST OF TABLES** ........................................... v

**Chapter**

I. **INTRODUCTION** ........................................... 1
   - Statement of the Problem
   - Purpose of the Study
   - Hypotheses
   - Background and Significance of the Study
   - Definition of Terms
   - Basic Assumptions
   - Limitations
   - Organization of the Study

II. **REVIEW OF THE LITERATURE** .......................... 13
   - Definitions of Attitude
   - The Need for Attitude Studies
   - Reasons for Attitude Change
   - Theories of Attitude Change
   - Pedagogical Research of Attitudes
   - Attitude Studies Utilizing the
     - **Minnesota Teacher Attitude Inventory**
   - Studies of Attitudes

III. **METHODS AND PROCEDURES** .......................... 44
   - Description of the Sample
   - The Instrument
   - Procedures for Collecting Data
   - Procedures for Analysis of Data

IV. **PRESENTATION OF THE DATA** .......................... 57
   - Introduction
   - Hypothesis I
   - Hypothesis II
   - Hypothesis III
   - Hypothesis IV
   - Hypothesis V
   - Hypothesis VI
   - Hypothesis VII
<table>
<thead>
<tr>
<th>Hypothesis VIII</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypothesis IX</td>
</tr>
<tr>
<td>Hypothesis X</td>
</tr>
</tbody>
</table>

V. SUMMARY, FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

<table>
<thead>
<tr>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Findings</td>
</tr>
<tr>
<td>Conclusions</td>
</tr>
<tr>
<td>Recommendations</td>
</tr>
</tbody>
</table>

APPENDIX

| 87 |

BIBLIOGRAPHY

<p>| 104 |</p>
<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.</td>
<td>Means and Standard Deviations of Pretest and Posttest Scores of Group I and Group II</td>
<td>59</td>
</tr>
<tr>
<td>II.</td>
<td>Mean Gain Scores and Difference of Group I and Group II from the Pretest to the Posttest</td>
<td>60</td>
</tr>
<tr>
<td>III.</td>
<td>Means and Standard Deviations of Pretest and Posttest Scores of Group III and Group IV</td>
<td>61</td>
</tr>
<tr>
<td>IV.</td>
<td>Mean Gain Scores and Difference of Group III and Group IV from the Pretest to the Posttest</td>
<td>63</td>
</tr>
<tr>
<td>V.</td>
<td>Means and Standard Deviations of Pretest and Posttest Scores of Group V and Group VI</td>
<td>64</td>
</tr>
<tr>
<td>VI.</td>
<td>Mean Gain Scores and Difference of Group V and Group VI from the Pretest to the Posttest</td>
<td>65</td>
</tr>
<tr>
<td>VII.</td>
<td>Means and Standard Deviations of Pretest and Posttest Scores of Group VII and Group VIII</td>
<td>67</td>
</tr>
<tr>
<td>VIII.</td>
<td>Mean Gain Scores and Difference of Group VII and Group VIII from the Pretest to the Posttest</td>
<td>68</td>
</tr>
<tr>
<td>IX.</td>
<td>Pretest and Posttest Scores Used to Determine the Significance of Attitude Change Toward the Concept Engineering Drawing</td>
<td>69</td>
</tr>
<tr>
<td>X.</td>
<td>Pretest and Posttest Scores Used to Determine the Significance of Attitude Change Toward the Concept Woodworking</td>
<td>70</td>
</tr>
<tr>
<td>Table</td>
<td>Page</td>
<td></td>
</tr>
<tr>
<td>---------</td>
<td>------</td>
<td></td>
</tr>
<tr>
<td>XI.</td>
<td>71</td>
<td></td>
</tr>
<tr>
<td>XII.</td>
<td>73</td>
<td></td>
</tr>
<tr>
<td>XIII.</td>
<td>74</td>
<td></td>
</tr>
<tr>
<td>XIV.</td>
<td>75</td>
<td></td>
</tr>
</tbody>
</table>

XII. Pretest and Posttest Scores Used to Determine the Significance of Attitude Change Toward the Concept Graphic Arts

XIII. Pretest and Posttest Scores Used to Determine the Significance of Attitude Change Toward the Concept Power Mechanics

XIV. Pretest and Posttest Scores Used to Determine the Significance of Attitude Change Toward the Concept Industrial Arts
CHAPTER I

INTRODUCTION

The college freshman's attitude toward specific curricu-lum areas before and after completion of any given course will undoubtedly have a direct bearing on his success or failure in college. Therefore, it is suggested that the achievement of the beginning college student will be either furthered or impaired by preconceived and postconceived attitudes formulated at the beginning and end of his first semester in college.

One of the foremost objectives of education today is to acquire the ability to change and redirect basic attitudes of students. Recent research has indicated that in this area the university is performing inadequately (4). Recognizing the importance of attitude and attitude change in the learning process, Olson (7) concluded that one of the most influential variables in the teaching-learning process is that of the student's attitude structure.

Numerous studies have been made in recent years in an attempt to ascertain attitude changes of university students (4). However, a review of these studies indicates that little has been done toward measuring the attitude change of university freshmen enrolled in industrial arts. In view of
this deficiency, it seems apparent that results of this study would be beneficial to universities, professors, and administrative personnel.

Statement of the Problem

The problem of this study was to determine the effect of industrial arts experiences on changing the attitudes of North Texas State University freshmen toward industrial arts generally and toward specific curriculum areas in industrial arts.

Purpose of the Study

The purposes of this study were threefold:

1. To determine the effect of the industrial arts curriculum on the attitudes of university freshmen toward industrial arts and specific curriculum areas in industrial arts.

2. To determine the degree of attitude difference between industrial arts majors and non-industrial arts majors.

3. To determine if an attitude difference exists in students who were enrolled in industrial arts in high school as opposed to those who received no instruction in industrial arts in the secondary school.

Hypotheses

The following hypotheses were formulated and stated in the null form in order that each might be tested by utilizing the mean difference obtained by a pretest and a posttest:
Hypothesis I.—There will be no significant difference as measured by the "Semantic Differential" in the attitude change toward industrial arts of non-industrial arts majors as compared with industrial arts majors.

Hypothesis II.—There will be no significant difference as measured by the "Semantic Differential" in the attitude change of students toward industrial arts who were enrolled in secondary industrial arts as compared with the students who were not enrolled in industrial arts at the secondary level.

Hypothesis III.—There will be no significant difference as measured by the "Semantic Differential" in the attitude change of students toward industrial arts who were enrolled for one semester of industrial arts at the secondary level as opposed to those students who enrolled in more than one semester of industrial arts.

Hypothesis IV.—There will be no significant difference as measured by the "Semantic Differential" in the attitude change of freshman male students toward industrial arts who enrolled in industrial arts as compared to freshman female students enrolled in industrial arts.

Hypothesis V.—There will be no significant difference in attitude change, as indicated by the mean difference obtained by the "Semantic Differential" pretest and posttest,
toward engineering drawing as indicated by university freshmen enrolled in engineering drawing.

Hypothesis VI.—There will be no significant difference in attitude change, as indicated by the mean difference obtained by the "Semantic Differential" pretest and posttest, toward woodworking as indicated by university freshmen enrolled in woodworking.

Hypothesis VII.—There will be no significant difference in attitude change, as indicated by the mean difference obtained by the "Semantic Differential" pretest and posttest, toward metalworking as indicated by university freshmen enrolled in metalworking.

Hypothesis VIII.—There will be no significant difference in attitude change, as indicated by the mean difference obtained by the "Semantic Differential" pretest and posttest, toward graphic arts as indicated by university freshmen enrolled in graphic arts.

Hypothesis IX.—There will be no significant difference in attitude change, as indicated by the mean difference obtained by the "Semantic Differential" pretest and posttest, toward power mechanics as indicated by university freshmen enrolled in power mechanics.
Hypothesis X.--There will be no significant difference in attitude change, as indicated by the mean difference obtained by the "Semantic Differential" pretest and posttest, toward the concept of industrial arts as indicated by university freshmen enrolled in industrial arts.

Each hypothesis was compared by utilizing a pretest administered on the first class day of the fall semester of 1970 and a posttest administered on the last class day of the fall semester of 1970. In the event that there was a significant difference, a higher mean value on the posttest indicated a favorable attitude change.

Background and Significance of the Study

A survey of related literature indicated that significant research has been done in the area of attitude change (9), but little formal investigation has been conducted in the area of attitude and attitude change toward industrial arts and specific curriculum areas in industrial arts. This study was an attempt to fulfill partially this insufficiency.

Remmers indicated that more studies involving attitude and attitude change should be done for the following reason:

Such studies are important in indicating the effect of various types of stimulation in shaping and maintaining attitudes, and point to the tremendous importance of school and community indoctrination in creating beliefs consistent with our aims and values (8, p. 196).

Dunham (3) also emphasized in his study the need for the assessment of student attitudes. He advocated that the
measurement of the student's attitudes may help in evaluating the strengths and weaknesses of a specific curriculum area. Burton and Brueckner (1) are in agreement that attitude scales should be utilized in the assessment of student attitudes, for they felt that in using attitude scales it is possible to identify strengths and weaknesses of an individual toward certain points of view.

The study of attitudes has thus become increasingly important. As Remmers (8) pointed out, all attitudes are theoretically a component of behavior, both overt and covert. In pointing out the significance of attitude measurement, Shaw and Wright (9) stated that, if the attitude of a person toward a particular object or event were known, it could be used in conjunction with variables that might predict and explain the reactions of the person toward a certain object or event. The results of the study of attitude change might also be used to manipulate the individual's reactions to relevant and meaningful criteria (9).

Dawson (2) stated that, after a student has been exposed to new concepts and ideas which shape and redirect his attitude, too few people take the time to discover what change, if any, has taken place in the student's attitude. He further stated that exposure to a college course can and will affect a student's attitude (2). Of the students involved in Dawson's study, most indicated the cause of their change in attitude was the instructor's lectures (2).
Remmers (8) also believed that exposure to college courses will change a student's attitude, but he felt that the change is brought about by the interaction with the professor, classmates, and the total environment, and that the student's attitudes will be modified in accordance with his own goals and drives. If studies of this nature reveal an adverse reaction in change of attitude, perhaps the instructors should restructure their method of presentation of course material.

According to a study by Neidt and Hedlund (6), one of the basic objectives of education is to allow students to perform and achieve at a rate in accord with their capabilities. They found a direct relationship between the ability to achieve and the attitude of the student. Therefore, it would seem justifiable to assess student attitudes in order to aid in the revamping and revitalization of specific curriculum areas.

Definition of Terms

For the purpose of this study the following definitions were used:

Attitude: a learned, evaluative reaction concerning the characteristics of a social object or class of social objects; attitude may also be defined as a state of readiness, organized through experience, exerting a marked influence upon the student's response to objects and situations to which it is related (1).
**Attitude change**: the change, or difference, in attitude indicated from the pretest to the posttest as measured by the "Semantic Differential."

**Freshman**: a student enrolled for the first time at North Texas State University for the fall semester of 1970, and one who completed secondary course requirements in the spring of 1970.

**Industrial arts major**: a student who has demonstrated a desire to complete a minimum of forty-eight semester hours in the area of industrial arts.

**Non-industrial arts major**: either a student who has demonstrated a desire to concentrate in a field other than industrial arts or a student, at the time of the pretest, who is undecided as to the curricular area in which he wishes to major.

**Industrial arts curriculum**: a series of integrated courses in the area of graphic arts, power mechanics, woodworking, metalwork, and engineering drawing. For the purpose of this study the industrial arts curriculum will be identified by the following one-hundred-level courses offered by the Industrial Arts Department of North Texas State University: Industrial Arts 106, Industrial Arts 107, Industrial Arts 121, Industrial Arts 122, and Industrial Arts 128.

**Industrial arts experience**: experience that is derived from an interaction with people, tools, machines, materials, and processes and that is under the supervision of a faculty
member of the Industrial Arts Department of North Texas State University.

**Group One:** freshmen enrolled in a one-hundred-level industrial arts course who demonstrated a desire to major in industrial arts.

**Group Two:** freshmen enrolled in a one-hundred-level industrial arts course who demonstrated a desire to major in a curriculum area other than industrial arts.

**Group Three:** freshmen enrolled in a one-hundred-level industrial arts course who had been enrolled in industrial arts at the secondary level.

**Group Four:** freshmen enrolled in a one-hundred-level industrial arts course who had no formal instruction in the area of industrial arts at the secondary level.

**Group Five:** freshmen enrolled in a one-hundred-level industrial arts course who had been enrolled in only one semester of secondary industrial arts.

**Group Six:** freshmen enrolled in a one-hundred-level industrial arts course who had been enrolled in industrial arts at the secondary level for more than one semester.

**Group Seven:** freshman male students enrolled in one-hundred-level industrial arts courses.

**Group Eight:** freshman female students enrolled in one-hundred-level industrial arts courses.

**Group Nine:** freshmen enrolled in Industrial Arts 106.

**Group Ten:** freshmen enrolled in Industrial Arts 107.
Group Eleven: freshmen enrolled in Industrial Arts 121.
Group Twelve: freshmen enrolled in Industrial Arts 122.
Group Thirteen: freshmen enrolled in Industrial Arts 123.
Group Fourteen: the entire population of freshman students enrolled in the following one-hundred-level courses offered by the Industrial Arts Department of North Texas State University: Graphic Arts 106, Power Mechanics 107, Woodworking 121, Metalworking 122, and Engineering Drawing 123.

Basic Assumptions

For the purpose of this study the following assumptions were formulated:

1. It was assumed that the factors outside the Industrial Arts Department similar to those experienced in industrial arts did not affect the attitude changes of the participants.

2. It was assumed that those experiences unique to college life in general did not affect the attitude changes of those students participating in the study.

3. It was assumed that through the utilization of all the teachers of freshman-level courses in the Industrial Arts Department the biases which might come from a single instructor were negated and did not affect the attitude of the students.
Limitations

This study was limited to those students entering the freshman classes of North Texas State University in the fall of 1970, who graduated from a secondary school in the spring of 1970, and who had not been enrolled previously in a college or university.

Organization of the Study

For purposes of presenting the findings, the content is arranged into five chapters. The first chapter includes an introduction, statement of the problem, purpose of the study, hypotheses, background and significance of the study, definition of terms, and basic assumptions and limitations. The second chapter is a review of the literature with emphasis placed on definitions of attitude, the need for attitude studies, reasons for attitude change, theories of attitude change, pedagogical research of attitudes, attitude studies utilizing the Minnesota Teacher Attitude Inventory, and studies of attitudes. Chapter III is concerned with methods and procedures, description of the sample, the instrument, procedures for collecting data, and procedures for analysis of the data. The fourth chapter contains an analysis of the data with the statistical treatment presented in tabular form. Chapter V is a summary of the study and presents the findings, conclusions, and recommendations.
CHAPTER BIBLIOGRAPHY


CHAPTER II

REVIEW OF THE LITERATURE

The term "attitude" is a transliteration from "aptitude," a term once used exclusively by painters and sculptors. "Aptitude" is derived from the Latin word "aptitude," which in turn is derived from "aptus," meaning suited or fitted. When the transition from "aptitude" to "attitude" had taken place, the connotation changed from a well-defined concept to a more general one (19).

The first study that concerned attitudes has been traced to a study done in 1888 by L. Lange (30). His study (38) revealed that a subject who was both mentally alert and prepared to press a telegraph key did so more quickly than did the subject whose attention was directed mainly to the incoming stimulus and not upon the expected reaction. The resulting response was called the subject's aufgabe or task-attitude (36).

Although Lange's study was the first to be concerned with attitudes, Hovland's work is considered to be the impetus that led contemporary research. He began his work on attitude change while he was with the Information and Education Division of the War Department during World War II. Since
that time research in this area has grown until now there are a number of attitude-change theories (29).

Definitions of Attitude

Although there have been varied definitions of the terms "opinion" and "attitude," Yanofsky (64) stated that in most cases attitudes are more stable, personal, and subjective than opinions. He pointed out that "opinions" are regarded generally as temporary, reasoned, and impersonal. Wiebe gave the following definition for attitude and opinion:

"Whereas one feels an attitude as an immediate, intuitive orientation, one thinks out, calculates an opinion as a solution to a problem, or as a reasoned choice among possible alternatives for interaction in a social matrix" (63, p. 328).

Schultz (50) discovered that most of the researchers in the field of attitude and attitude change agree that attitudes are learned predispositions to respond in an evaluative sense. He further stated that these predispositions are usually bipolar in nature and that they may be measured in terms of direction and intensity. Yanofsky (64) presented evidence that the majority of theorists, in psychology, agree that attitudes cannot be seen or measured directly but must be inferred from behavior. A definition similar to this is given by Sherif, Sherif, and Nebergall (56): "attitudes are inferred from characteristic and consistent modes of behavior
toward some class of objects, persons, events and issues over a time span") (56, p. 119).

In defining "attitude," Allport reported, "an attitude is a mental and neural state of readiness, organized through experience, exerting a directive or dynamic influence upon the individual's response to all objects and situations with which it is related" (93, p. 43).

Katz and Stotland interpreted attitude as a "tendency or disposition to evaluate an object or the symbol of that object in a certain way" (33, p. 13). Krech and Crutchfield defined an attitude as "an enduring organization of motivational, emotional, perceptual, and cognitive processes with respect to some aspect of the individuals" (38, p. 152).

In trying to define attitude Campbell issued the following statement:

Research on social attitudes has been justly criticized for a lack of common definition of the concept, and for a failure to integrate definition and measurement procedures. This paradox arises from definitional attempts which confound explanations of the phenomena with the process of pointing to the phenomena. It is the contention of the present writer that agreement on the implicit operational (or pointing) definition of attitudes is already present. As a tentative formulation the following is offered: A social attitude is (or is evidenced by) consistency in response to social objects. If we look at those definitions utilizing concepts of set, or readiness to respond—for example, Allport's (1935) 'An attitude is a mental and neural state or readiness,' the symptoms of a 'directive or dynamic influence,' criterion as to the 'objects and situations to which it is related,' these evidences will be, in final analysis, consistency of predictability among
responses. An individual's social attitude is a syndrome of response consistency with regard to social objects. And even those whose behavioristic orientation leads to a rejection of such mentalistic definitions as Allport's and who would say with Bain (1928) and Horowitz (1944, p. 142), 'essentially . . . the attitude must be considered a response rather than a set to respond' -- in research practice do not equate isolated responses with attitudes; but on the contrary, look for the appearance of response consistencies. This is dramatically evidenced by Horowitz's (1936) use of the appearance of consistent differentiated response to photographs of Negro and white children to mark the occurrence of race prejudice in children (17, p. 17).

Doob (18) stated that attitudes may be acquired through direct and indirect associations while Fishbein and Hunter (21) felt that an individual's attitude toward any object is a function of his beliefs about the object together with the evaluative aspect of those beliefs. As a result of their study, Fishbein and Hunter concluded that the process of attitude organization and change is a process of cognitive summation and not cognitive balance.

Halloran (25) felt that any attempt to define the term "attitude" is complex because the concepts overlap with different psychological concepts. Katz (32) and many others (25) felt that attitudes include both the affective and the cognitive or belief elements, which perceive and describe the object of the attitude, its characteristics, and its relationships to other objects.
The Need for Attitude Studies

Husek and Wittrock (28) stated that the assessment of student attitudes toward teachers is an important area of interest for at least two reasons: (1) Educators are concerned about student attitudes toward teaching because of the importance of recruiting the more capable students to the teaching profession. (2) There is a need to assess student attitude toward the teaching profession because of the innovative ideas that are now being introduced in the teaching field.

Van Keuren and Benjamin Lease (61) maintained that one of the major problems which confronts higher education is that of improving college teaching. They stated that teaching methods should be appraised periodically; one means of doing so is to survey student attitudes. Realizing the total educational program should not be evaluated merely on the attitudes and opinions of students, they pointed out that students are the major consumers of education; consequently, their attitudes and opinions should be weighed carefully.

In emphasizing the importance of the study of attitudes, Scates stated, "Attitudes of understanding and appreciation of children as children are highly important. If they are not present, every effort must be made to develop them" (49, p. 275). Vitrogan (62) also believes that a person's attitudes represent an important aspect of his personality and
that they also play an important role in the development of individual behavior.

Perrodin likewise emphasized the importance of studying the attitudes of students; he stated, "The attitudes developed in elementary school will certainly affect choices made in high school, college and adult life" (46, p. 214).

Reasons for Attitude Change

In an investigation of attitude change Tannenbaum (58) stated that weakly-held attitudes are more susceptible to change than strongly-held attitudes. In his study of attitude change, he tested the following hypotheses:

**Susceptibility Hypothesis:** The amount of attitude change toward an objective is inversely proportional to the intensity of the original attitude toward that object.

**Relationship Hypothesis:** (a) The amount of attitude change toward the concept in direction of the assertion is directly proportional to the degree of favorableness of the original attitude toward the source. (b) The amount of attitude change toward the source in a favorable direction is directly proportional to the degree of favorableness of the original attitude toward the concept when the assertion is favorable, but is inversely proportional when the assertion is unfavorable (58, p. 414).

As a result of his investigation, he found that the susceptibility to change is inversely proportional to the intensity of the initial attitude. Tannenbaum (58) further stated that on several occasions attitude change toward communication material has been investigated, but no apparent change took place. A probable reason for this lack of change
could be because of the highly-structured attitudes that were present at the onset of the study.

In discussing attitude and attitude change Schein stated the following:

Given these general assumptions about the integration of attitude in the person, it is appropriate to consider influence as a process which occurs over time and which includes three phases:

1. Unfreezing: An alteration of the forces acting on the individual, such that his stable equilibrium is disturbed sufficiently to motivate him and to make him ready to change; this can be accomplished either by increasing the pressure to change or by reducing some of the threats or resistances to change.

2. Changing: The presentation of a direction of change and the actual process of learning new attitudes. This process occurs basically by one of two mechanisms: (a) identification—the person learns new attitudes by identifying with and emulating some other person who holds those attitudes; (b) internalization—the person learns new attitudes by being placed in a situation where new attitudes are demanded of him as a way of solving problems which confront him and which he cannot avoid; he discovers the new attitudes essentially for himself, though the situation may guide him to make it probable that he will discover only those attitudes which the influence agent wishes him to discover.

3. Refreezing: The integration of the changed attitudes into the rest of the personality and/or into ongoing significant emotional relationships (54, pp. 5-42).

In the interpretation of Schein's outline, Guerin and McKeand gave the following definition to unfreezing, changing, and refreezing:

Unfreezing: The alteration of the forces acting on the individual. Remove the individual from those situations and social relationships which tended to confirm and reinforce the validity of the old attitudes.
Changing: The process of learning new attitudes. Help the individual find one or more models in his social environment who demonstrate (live the new attitude, belief or value), and support the individual's attempts to become like the model.

Refreezing: The process by which the newly acquired attitude comes to be integrated into the individual's personality and ongoing relationships (23, p. 144).

In changing the attitudes of students, Schein (54) felt that a mild form of coercive persuasion may be necessary. He indicated that the teacher should use inductive teaching-learning processes, forced-choice decision, and stress situations that challenge the students' ability to use inductive reasoning.

In discussing attitude change in communication, Osgood and Tannenbaum (44) suggested three variables that might influence attitude change toward communication: (1) existing attitude toward the speaker, (2) existing attitude toward the proposition, and (3) the speaker's support or opposition toward the proposition.

Teigland (60) hypothesized several reasons for attitude change: (1) the need or necessity to change attitude to coincide with the teacher and (2) the reward of doing well as an incentive to change attitudes. In reference to attitude change Abbatiello stated:

Changes would be expected to appear whenever anyone participates in a learning experience. These changes, of course, will be peculiar to the population sampled, to the material to which the participants are exposed, and to the training methods used in the program (60, p. 34).
Theories of Attitude Change

Reinforcement Theory

One basic theory of attitude change was developed by Hovland (27) and his associates. The underlying hypothesis of this theory implied that attitude change resulted from learning produced through reinforcement (29). Scott (51) investigated the reinforcement theory and found that the students involved in his study who were reinforced by peer approval for expressing an attitude opposite to their own showed a change in the direction of the expressed attitude.

Insko (29) investigated the effect of verbal reinforcement upon communication made by the telephone and concluded from his study that verbal reinforcement does have a lasting effect upon attitudes and is not just a temporary modification of attitudes. Concerned with the reinforcement theory, he made the following statement: "Attitudinal verbal reinforcement occurs when a subject encounters some expression of agreement with or approval for his repeated opinion and attitude statements" (29, p. 18).

In a study at Hollis College, Calvin (10) found that social reinforcement could change student attitudes toward the color of apparel worn to class. They found that after thirteen days of verbal reinforcement such as "My, that is an attractive dress," 17 per cent of the students involved in the study were influenced by the use of social reinforcement.
Goldstein and McGinnies (22) investigated the reinforcing effect of group discussion on the attitudes of the participants and found that the group as a whole did not change its attitude after the introduction of "antichurch" literature. The significant finding, however, was in the attitude change of the speakers who read the "antichurch" literature to the group. They found that the speakers' attitude, as measured by an attitude questionnaire, changed in the direction of the "antichurch" literature.

Another means of alteration or modification of attitudes is through classical conditioning (29). Cohen (13) investigated the relationship between attitude change and classical conditioning and discovered that there was a change in attitude toward nonsense syllables only when students were aware of the conditioning process.

Insko made the following comment about the classical conditioning of attitudes:

Our survey of the literature concerned with the classical conditioning of attitude and opinion has revealed several different experimental approaches. Some research has used symbolic reinforcement and some has used more primitive reinforcement such as food or unpleasant odors. From the present vantage point it does appear as if classical conditioning is relevant to attitude and opinion change, but the evidence is far from confirmatory (29, p. 34).

Janis and Feshback (31) investigated the feasibility of using fear as a reinforcement agent to alter attitudes. For a population they used high school students and presented to
them a series of slides and lectures on the cause and prevention of tooth decay. To introduce fear as a reinforcement agent, they emphasized the painful consequences of improper tooth care. The investigation revealed that the strong fear-arousing communication produced the least reported change in dental care and that the negative reaction was probably due to the strong emotion that might have prevented the student from having complete recall of the slides and lectures.

Haefner (24), De Wolfe and Governole (17), Insko (29), and Arkoff and Insko (4) supported Janis and Feshbach's (31) attitude-change theory and reported that strong, fear-arousing communications are less persuasive than weak fear and guilt-arousing communications. However, Rosenblatt (48) reported an inverse reaction to the Janis and Feshbach theory. In his study he concluded that a strong, fear-arousing communication is more effective than a weak, fear-arousing communication.

**Assimilation Theory**

Sherif and Hovland (55) developed another theory of attitude change known as the assimilation theory. According to Insko (29), the theory utilized the formation of reference scales, anchors, contrast, assimilation, and latitudes of acceptance and rejection. In defining these terms Insko used the following:

**Reference Scale:** When repeatedly presented with a number of stimuli, individuals tend to
form scales that allow for the relative placement of these stimuli along one or more dimensions.

**Anchors:** Stimuli which exert a relatively large influence upon the determination of judgment, such as end points in a series of stimuli or standard stimuli. . . .

**Contrast and Assimilation:** Contrast is a shift in judgment away from an anchor, and assimilation is a shift in judgment toward an anchor.

**Latitude of acceptance and rejection:** The latitude of acceptance is operationally defined in terms of the range of Thurston-type scale statements that are considered acceptable (including the one most acceptable). The latitude of rejection consists of all of those points of view that the individual finds unacceptable, or, in operational terms, the range of items that are considered objectionable (29, p. 64).

Insko (29) reported that Hovland, Harvey, and Sherif were the first researchers to collect data pertaining to the latitudes of acceptance and rejection. In their investigation they found that subjects whose most acceptable positions were at the extreme ends of the scale tended to have smaller latitudes of acceptance and larger latitudes of rejection than did the subjects whose most acceptable positions were more intermediate.

In investigating the effects of mathematics and science on the latitudes of acceptance or rejection, Miller (40) concluded that there was no correlation between the amount of mathematics and science studied and a student's attitude toward the two subjects.

In evaluating the assimilation contrast theory of attitude change, Insko made the following statement:
The assimilation-contrast theory, at least in the present form, is not a serious contender in the field of attitude change. This does not mean that judgmental principles have no relevance to attitude change. It just means that such relevance has not been adequately demonstrated (29, p. 91).

**Congruity Theory**

The congruity theory of attitude change was introduced in 1955 by Osgood and Tannenbaum (45). According to this theory, when two attitude objects of differing evaluation are linked, there is a tendency for the evaluations of each object to shift toward a point of equilibrium or congruity. As an example of the congruity theory, Insko used the following analogy:

If Eisenhower praised Khrushchev there would be a tendency for Khrushchev to be evaluated more highly and Eisenhower less highly. If on the other hand, Eisenhower praised democracy or Khrushchev praised communism there would be no movement toward equilibrium because the associated attitude objects are equally positively or negatively evaluated (29, p. 113).

Stachowiak and Moss (57) used an evaluative "Semantic Differential" on a group of male college students and found evidence that supported the congruity theory with regard to the direction of change but not with regard to the amount of change.

While investigating the principle of congruity in the area of speech, Berlo and Gulley (6) stated that, before an individual listens to a speech, his propositions are often not congruent. As regards the congruity principle, they
feel that after receiving communication the individual comes under internal pressure to make his attitudes toward speaker and proposition congruent. In using the principle of congruity, the researcher is able to predict the observable effect of internal pressure in terms of both the direction and the magnitude of attitude change toward both speaker and concept (6).

In researching the capability of the congruity model to predict concept change under the influence of both relevant and non-relevant sources, Kerrick (34) concluded that the congruity model is insufficient insofar as it does not include the variable of source relevancy. He used the "Semantic Differential" as an instrument to measure attitude change toward the following concepts and sources: **Concepts:**

(1) protective tariffs for farm products, (2) abstract art, (3) flexible price supports, (4) recognition; **Sources:**


Kerrick (34) paired the concepts and sources so that a source, Henry Wallace, was relevant to one concept, protective tariffs for farm products, but not relevant to another concept, abstract art. After submitting her forty subjects to a pretest and a posttest, she found that in the relevant situation two of the four sources and two of the four concepts showed significant change, while in the non-relevant situation one source and one concept showed significant change.
Tannenbaum and Gengel (59) investigated the generalization of attitude change through congruity-principle relationships. They found that a change in attitude toward a given concept will generalize to produce a change in attitude toward a source which previously made an assertion about that concept. The researchers used the "Semantic Differential" to evaluate their subjects' concepts of "teaching machines" along with three sources, "Dr. George L. Marclay," "Dr. Walter E. Samuels," and "Dr. Kenneth W. Spence." The three professors were to create a gap between the source and concept. One professor was to oppose teaching machines; one was to favor them, and the third professor was to remain neutral.

If the congruity theory of attitude change is to be achieved, a favorable change in attitude toward the concept should produce a favorable attitude toward the source, and a negative change in attitude toward the concept should produce a negative change in attitude toward the source (29). However, this was not the case in Tannenbaum and Gengel's study (59) because the changes were always in a positive direction.

In evaluating Osgood and Tannenbaum's Congruity Theory, Insko said,

One thing that detracts from the elegance of the theory is that it is bolstered by two ad hoc corrections, one involving incredulity and the other, assertions. Neither of these corrections follows from the congruity principle and both
are simply introduced, in an attempt to patch up and make more reasonable some of the congruity implications. The theory is also internally weak due to the fact that no definition of the crucial concept of assertion is given, and no satisfactory distinction between associative and dissociative assertions is made (29, p. 139).

**Inoculation Theory**

McGuire (42), concerned with attitude change, developed an inoculation theory that investigated attitudes resistant to change. Basically this theory operates around the same supposition as does the biological treatment of disease. If one has a disease, he treats it either by medicine or by a special diet. In the same light if a person is to resist counter-attitudinal propaganda, his attitude must be made healthier. This may be done by providing supportive information and arguments or by presenting the individual with weakened counter-attitudinal propaganda.

In discussing the weakness of the inoculation theory, Insko stated,

A major shortcoming of the inoculation theory has to do with the failure of the sequence of order predictions. Not a single one of these predictions has been upheld, and in some cases effects exactly contrary to prediction have been obtained. It seems likely that the failure of these sequence predictions will force an eventual revision of McGuire's theoretical statements (29, p. 328).
Pedagogical Research of Attitudes

In investigating the feasibility of changing student attitudes by means of a college course, Dawson (15) concluded that student attitudes could be changed in this way. In most cases he found the instructor's lectures were the influential factor in changing the attitudes of the students, regardless of the direction of attitude change. He indicated that the assessment of student attitudes was of the utmost importance and that teachers from time to time should administer an attitude inventory to determine the possible effects of their courses and their methods on students.

Brim (8) investigated the effect of a teacher-education program upon the attitudes toward children of undergraduate students. He found that in recent years the effectiveness of teacher education has been questioned and for good reason; as he stated, responsible people in the department of education are seldom able to define the role of teacher education. It was his purpose to discover the nature and sources of these changes in undergraduate-student attitudes toward children while in such a teacher-education program. He concluded from his study that the attitude of his population did change. The direction and intensity fluctuated on an individual basis, but as a group there was a highly significant overall change to a higher attitude mean. As a result of personal interviews with students enrolled in a teacher education program, he designated the following as causes of
change in attitudes toward children: (1) laboratory experiences, (2) observations of children, both in the classroom and on the playground, (3) observation of their supervising teacher, (4) interaction with children, (5) informal association with teachers, (6) outside reading, (7) class discussions, and (8) experiences outside the teacher-education program.

Campbell (11) investigated the effectiveness of student teaching upon the attitude changes of student teachers and found that within the limits of the study no significant difference in attitude resulted because of a student-teaching experience.

Boldt and Stroud (7) conducted a study to determine whether the influence of college training would tend to make a student more liberal or conservative or whether he would remain unaffected. Upon completion of the study, they found that college students did tend to become more liberal as a result of training. In the interpretation of data they hypothesized that the majority of the student's attitude change was due to the influence of college life rather than to age level and maturity.

In reference to attitude change, Kerrick and McMillan stated, "attitude change must be considered a part of a natural process of continual verification and modification of perceptions about objects or concepts" (35, p. 119). They investigated, by means of a pretest and a posttest, the
attitude change of journalism students. In their study they used an experimental group that was informed of the nature of the study and a control group that was "masked." The results of the study revealed that the informed group had less tendency to change its attitudes in response to news stories while the uninformed group showed attitude change in the direction opposite to the news story.

In trying to assess children's attitude toward science, Perrodin (46) used a projective-type instrument. His population consisted of students in grades four through eight. From his study he concluded that fourth graders in general had a favorable attitude toward science; the attitude toward science peaked in the sixth grade and began to decline in the eighth grade. One of his recommendations was to study the methods of teaching employed in science and also to study the attitudes expressed by the students.

Aiken (2) hypothesized that the attitude that a student had toward a mathematics course would influence his final grade in the course. He concluded, however, that a student's attitude toward mathematics is directly related to intellectual factors and achievement. He also found that interaction with former mathematics teachers influenced a student's attitude, but parental encouragement and traumatic experiences apparently had no effect on his attitude.

Neidt and Hedlund (43) investigated the relationship between change in student attitudes toward a class in which
he was participating and final achievement in that class and found that student attitudes did become progressively related to achievement in the learning experience as the period of instruction progressed. In their study they also found that attitude and attitude change were related to final course grades if the final-grade variance due to ability were controlled.

Dutton (20) questioned the nature of student teaching, for he found that both highly anxious and non-anxious elementary student teachers changed their attitude, in a negative direction, toward their students. In regard to the student-teaching experiences, he felt that these experiences are either quite realistic or unduly stressful. He also found that the highly anxious student teacher who expresses negative attitudes tends to perceive his students in a negative manner.

McCroskey (41) utilized the "Semantic Differential" to measure the effect of the basic speech course on students' attitudes. To test the hypotheses, the student attitudes were measured by means of a pretest and a posttest. The major hypothesis was, "There is no difference between student's attitude toward themselves as speakers at the beginning of a basic speech course and their attitude toward themselves as speakers at the end of the course" (41, p. 115). This hypothesis was only found to be significant at better than the .001 level: therefore, the hypothesis was rejected. As a result of his investigation, McCroskey concluded that
the students' attitude toward themselves was better at the end of the semester than it was at the beginning of the semester: a benefit derived from a basic speech course was the student's increased confidence in his speaking ability.

Bugelski and Lester's study (9) involved the measurement of student attitudes in the freshman year, upon graduation, and three years after graduation. In their study they found a significant difference in the attitudes of university freshmen between their freshman and senior years. The change was in the direction of greater liberality and was attributed to general college experience.

Scott and Brinkley (52) investigated the attitudes of two groups of people: those student teachers who had a significantly higher attitude score than their supervising teacher and those student teachers who had a significantly lower attitude score than their supervising teacher. They found that the student teachers who had a significantly lower attitude score than the supervisory teacher improved significantly in their attitudes toward pupils during student teaching. However, the group of student teachers who worked with supervising teachers with a lower attitude score did not as a group change significantly in their attitudes toward pupils.

In examining 196 college seniors, Day (16) found there was a mean loss of 20.0 for the seniors who had been teaching for six months. This was in sharp contrast with the
group who prepared for but did not enter teaching, for they revealed a mean loss of only 1.5. In interpreting the data he implied that students are entering the teaching profession with unrealistic attitudes toward students and the work they pursue.

In a study to determine attitude change in an introductory education course, Schutz (50) administered a pretest and posttest and found that of the thirteen concepts being measured, ten were significant at the .05 level. The concept of dirty, lazy students was proved wrong; Negro, lower-class values, and Marxism changed in a positive direction. However, the concepts of middle-class values, conformity, fixed absolute facts, competition, and "keeping up with the Joneses" had a negative change. The concepts of generalization, foreigners, and common sense showed no significant attitude shift. One of the limitations that was imposed upon this study was the permanency of induced attitude changes, but the researchers did find that significant attitude changes did occur.

Attitude Studies Utilizing the Minnesota Teacher Attitude Inventory

The Minnesota Teacher Attitude Inventory (hereafter referred to as the MTAI) is modeled after Thurston's attitude-assessment technique. This particular technique requires a subject to indicate whether he strongly agrees, agrees, is undecided, disagrees, or strongly disagrees with each of 150
statements concerning children and their academic success. It is a basic assumption that a teacher ranking on the high end of the scale has been able to establish a mutual rapport with his students. In contrast, a teacher who is ranked on the low end of the scale is probably an authoritarian who perpetuates dislike for school work (14). The authors of the MTAI feel that an attitude change in an upward direction indicates a more positive and democratic attitude toward teacher-pupil relationship.

Teiglund (60) discovered, by using the MTAI, that the attitudes of prospective teachers changed in a positive direction after the completion of training in the field of teaching. Scates (49) indicated that in general the attitudes of classroom teachers reflect a lack of understanding of the principles of child development and child behavior.

The purpose of Rogers and Smith's study (47) was to discover whether it is possible in a six-week summer session to build desirable, professional attitudes concerning children and teaching. The MTAI was the instrument used to measure the attitudes of the participants in a teacher-training program. The t was significant at greater than the .001 level, but they felt that it was a poor instrument to use in the assessment of attitudes. According to the result of the MTAI, however, the program seems to be quite successful in building desirable, professional attitudes.
Shaw, Klausmeier, Luker, and Reid (53) investigated the changes occurring in teacher-pupil attitudes during a two-week guidance workshop. The subjects of the study came from twenty-four states and took the course for credit toward the B.A., M.A., or Ed.D. degree. The study indicated that there was a change in attitude and that professional courses in education had a direct bearing on their attitude change. They also found that the teachers with the better attitudes were found in the elementary grades and that the assessment of attitudes would be useful in evaluating the effectiveness of techniques in the professional education of teachers.

The validity of the MTAI has been questioned at times, but Scates (49) stated that the validity of the MTAI has been well established. He points out two factors that might possibly alter teacher attitudes: (1) the type of teacher-training institution attended; for example, liberal arts colleges create different attitudes from those developed at institutions that do not adhere to the policies and procedures of a liberal arts college; (2) the amount of education; for example, teachers who graduated from college tend to score higher on the MTAI than teachers who had only two years of college.

Studies of Attitudes

Barclay and Thumin (5) investigated the feasibility of using a form of the "Semantic Differential" to assess
attitudes toward hypothetical individuals who were described as using caffeine stimulants, one of which was mildly socially unacceptable. The result of their study indicated that those students who did use socially unacceptable stimulants were rated, in terms of personality characteristics, on the "Semantic Differential" in a negative direction.

The purpose of the study done by Abbatiello (1) was to determine if changes in attitudes occurred as a result of exposure to and participation in a training program for the development of supervisory talent. The technique used was the "Semantic Differential" because he indicated that this was the only technique that could identify relationships between content and assimilation.

Abbatiello (1) found that concepts with extreme ratings on a pretest tended to revert to a neutral position on the posttest. A probable explanation for the neutralizing of concepts is the demand of the subjects during the participation of a given program. From his study he drew the following conclusions:

1. Changes in attitudes do take place in the participant toward propaganda content.

2. The direction of these changes is from polarity toward a distinct neutral position.

3. Of the three factor loadings used, the evaluation factor is the most sensitive indicator of change.


CHAPTER III

METHODS AND PROCEDURES

This study was conducted in order to investigate the attitude changes toward industrial arts and its specific curriculum areas as indicated by North Texas State University freshmen who were enrolled in the program. The purpose of this chapter is to describe the subjects who participated in the study, to describe the instrument used for the study, to explain the method used in securing the data, and to explain the procedures used for the analysis of the data.

Description of the Sample

The students involved in the study were those who graduated from a secondary school in the spring of 1970, entered freshman industrial arts courses at North Texas State University in the fall of 1970, and had not previously been enrolled in a college or university. The industrial arts courses in which these students enrolled were Industrial Arts 106, Industrial Arts 107, Industrial Arts 121, Industrial Arts 122, and Industrial Arts 128.

The subjects were registered in 21 class sections, with a total enrollment of 118 freshmen. The registration for each specific course was as follows: Industrial Arts 106, 18 freshmen; Industrial Arts 107, 15 freshmen; Industrial
Arts 121, 16 freshmen; Industrial Arts 122, 17 freshmen; and Industrial Arts 128, 50 freshmen. There were 95 males and 23 females: of this total, 46 were industrial arts majors, while 72 were non-industrial arts majors. Eighty-two of these students were enrolled in secondary industrial arts, as compared to 36 who were not. Further, 16 were enrolled for one semester of secondary industrial arts, while 66 were enrolled for more than one semester of secondary industrial arts; 50 were enrolled in engineering drawing, 16 were enrolled in woodworking, 18 were enrolled in graphic arts, and 15 were enrolled in power mechanics.

The Instrument

The instrument used for the purpose of this study was the "Semantic Differential." The "Semantic Differential" was developed by Osgood and his associates, and, according to Hoover (6), it is a highly sensitive instrument for the measuring of attitudes.

In describing the logic behind the "Semantic Differential," Osgood and his associates states

We begin by postulating a semantic space; a region of some unknown dimensionality and Euclidian in character. Each semantic scale, defined by a pair of polar (opposite-in-meaning) adjectives, is assumed to represent a straight-line function that passes through the origin of this space, and a sample of such scales then represents a multidimensional space, the larger or more representative the sample the better defined is the space as a whole (12, p. 25).
In discussing "semantic space" Kerlinger (8) analogized it to a room with sticks projecting at right angles from the floor, from the wall, and from the ceiling. The sticks intersect each other; and, for clarity, the axes or co-ordinates are labeled X, Y, and Z. In the environmental atmosphere of the "semantic space," points will be scattered throughout the room: and some of the points may be clustered, or they may fall independently with reference to either the X axis, the Y coordinate, or the Z axis. For identification purposes, it would be necessary to label the points "a," "b," . . . "n," in any order. To identify the points specifically, the axes should be marked in an equal interval system; then by projecting from a point to the nearest coordinate, the point may be specifically identified or operationally defined. Through the utilization of factor analysis, a general meaning may then be ascribed to the X, Y, and Z axes; and the connotative "meaning" of each point would be a culmination of the meanings given X, Y, and Z.

The "Semantic Differential" is defined as a rating scale which utilizes one concept measured by several criteria. Each criterion is indicated as a pair of polar adjectives which are located at each end of a continuum that is divided into seven equal parts (11). The concept of industrial arts or one of the specific curriculum areas in industrial arts will appear at the top of the instrument, with twenty-five criteria scales appearing below. (Appendix C, D, E, F, G,
and H.) Each criterion scale is presented as a verbal scale with only the extremities of the continuum described. The number of intervals on the continuum will be indicated by a series of seven dashes, and the student is asked to check one of the dashes of each criterion scale, indicating the direction and intensity of his attitude toward a certain polar adjective.

In developing the semantic differential scale Osgood, Suci, and Tannenbaum (12) worked with three major scaling concepts: evaluation, potency, and activity. The evaluative concepts include pairs of adjectives such as good--bad, dirty--clean, ugly--beautiful, and kind--mean. The potency concepts are soft--hard, small--large, strong--weak, and brave--scared. Those concepts considered to reflect activity are hot--cold, red--green, quiet--lively, and slow--fast (4). To obtain the three major scaling concepts, various studies of criterion scales were intercorrelated, and the correlation matrix was factor-analyzed with a number of factors extracted, the major ones again being evaluation, potency, and activity (7).

There are no standard concepts or criterion scales; rather, each concept and scale is developed to meet the need of a particular study. The term concept is used to refer to the "stimulus" to which the subject's checking operation is a terminal "response." In the selection of concepts Osgood stated,
It is evident that the concepts judged against a semantic differential may be as varied in nature as may be the modes of signs, and the type selected depends chiefly upon the interests of the investigator (11, p. 194).

The nature of the problem is the determining factor in the selection of concepts; the researcher, however, should try to select concepts which would provide considerable individual differences.

In reference to the three major scaling concepts, Hoover (16) and Brinton (2) stated that of the three concepts the evaluative factor accounts for most of the semantic space for concepts in general. To minimize the effects of extraneous factors (such as "potency" and "activity"), Osgood, Suci, and Tannenbaum (12) stated that the assessment of attitudes could be taken by using only evaluative scales. Since the evaluative factor is the dominant dimension, the bipolar adjectives utilized in this study will be evaluative in nature. The adjectives that will be used in this study have been factor-analyzed in other studies (2, 10, 11).

The polar adjectives to be used are both relevant to and representative of the area of research interest and in most cases are selected by the "good judgment" of the researcher. In reference to the construction of criterion scales, Osgood, Suci, and Tannenbaum stated,

the particular scales which may, in any given research problem, best represent these factors, are variable and must be carefully selected by the experimenter to suit his purposes (12, p. 119).
Osgood and his associates (12) developed two graphic-scale methods. Form I of the "Semantic Differential" was a graphic representation with the concept appearing on the same line as the polar adjectives:

School Fair:___:___:___:___:___:___:___:Unfair
Education Big:___:___:___:___:___:___:___:Little

Form II, which placed the concept at the top of the paper with the criterion scales listed below, was utilized for this study:

SCHOOL

Fair:___:___:___:___:___:___:___:Unfair
Big:___:___:___:___:___:___:___:Little

Past research has shown Form II to have greater consistency of meaning for the concept being judged, and subjects seem to respond more readily to it than to Form I. Research has also shown that it is better to alter the factors in their polarity direction (e.g., good-bad but worthless-valuable) to avoid formation of position preferences (11).

The instructions of the "Semantic Differential" should cover three pertinent areas:

(1) orientation to the general nature of the task,
(2) the significance of the scale positions and the method of marking them, and
(3) the attitude to be taken toward the task (speed, first impressions, but true impressions) (11, p. 82).

The data that are obtained from the "Semantic Differential" are a collection of check marks with a numerical value
assigned to each blank. For the purpose of this study the digits used were 1, 2, 3, 4, 5, 6, and 7. The values -3, -2, -1, 0, +1, +2, and +3 could be used, but because of the negative numbers, most researchers prefer to use only positive digits (11).

The polar adjective that is most favorable was assigned a value of seven; the remaining dashes along the continuum had graduating denominations of one. Therefore, the most unfavorable polar adjective was assigned a value of one (11).

In discussion of the reliability and validity potential of the "Semantic Differential," Olson (10) noted that the instrument yielded the same properties as any attitude-measurement technique is expected to index. Osgood and his associates tested the validity of the "Semantic Differential" with scores on a Thurstone type scale. The assessment of attitude toward "the church," "Negro," and "capital punishment" revealed a correlation coefficient of .74, .82, and .81 respectively.

For a test to be reliable, it must consistently reproduce the same scores when the same objects are measured repeatedly. Osgood (11) found the "Semantic Differential" to have a reliability correlation coefficient of .85 with an N of 4,000. In 1953 Tannenbaum (13) investigated the test-retest reliability of the "Semantic Differential" and found the correlation coefficients ranged from .87 to .93 with a mean r (computed by z-transformation) of .91. Di Vesta and
Dick (3) reported in their study that the "Semantic Differential" is a reliable instrument and that the coefficients of stability are comparable to any other technique which requires judgment by an individual.

To check the validity of the "Semantic Differential," Osgood compared it with Thurstone scales and discovered that the "Semantic Differential" scores and the corresponding Thurstone scores are significantly greater than chance at the .01 level. In regard to the comparison of the two techniques he stated,

> It is apparent, then, that whatever the Thurstone scale measures, the evaluative factor of the semantic differential measures just about as well. Indeed, when the six validity coefficients are corrected for attenuation, each is raised to the order of .90 or better (12, p. 194).

An instrument is said to be valid when it measures what it purports to. In discussing the validity of the "Semantic Differential" Osgood stated,

> The semantic differential is proposed as an instrument for measuring meaning; ideally, therefore, we should correlate semantic differential scores with some independent criterion of meaning—but there is no commonly accepted quantitative criterion of meaning. In lieu of such a criterion, we have fallen back on what is usually called "face validity" (12, p. 140).

In the interpretation of face validity Fox (4) stated that face validity is merely a superficial examination of the instrument, that is, the face of the instrument.
Osgood also compared the evaluative scales of the "Semantic Differential" with a Guttman-type scale and found them to possess a rho of .78. In reference to the use of the "Semantic Differential" in lieu of the Guttman scale, Osgood said, "The Guttman scale and the evaluative scales of the differential are measuring the same thing to a considerable degree" (12, p. 94).

McCrosky (9) ran an experiment to determine if there were any correlation between the Likert-type scale and the "Semantic Differential." As a result of his study he found the two scales to produce a correlation coefficient of .85. These results prompted him to state the following:

The high correlations between the Likert and semantic differential scales are an indication of concurrent validity. Whatever the Likert scales measure, the semantic differential scales appear to measure equally as well. Since there is considerable justification for believing that the Likert scales are valid measures of the authoritativeness and character dimensions of ethos, we can also conclude that the semantic differential scales are valid measures of these dimensions (9, p. 71).

According to Galo (5), the "Semantic Differential" has tremendous potential for reflecting the complexity of multidimensional concepts. Abbatiello (1), after reviewing the information, found only one technique that would measure change in attitudes which occurred as a result of exposure to and participation in a training program for the development of supervisory talent—that technique being the "Semantic Differential."
Procedures for Collecting Data

Prior to the beginning of the fall semester of 1970, the chairman of the Industrial Arts Department gave permission for data to be secured from some of the entering freshmen in his department. Then each individual professor participating in the study was contacted and asked to help in the data-gathering process.

On the first class day of the fall semester of 1970, the instructor of each class used in the study was asked to administer the pretest immediately after introducing himself. In order to minimize criterion contamination, the instructor was asked to refrain from making any remark other than to tell the students that the test would in no way affect their semester grade. The posttest was given on the last regular class day of the fall semester of 1970.

In the administering of both the pretest and posttest, each student was given a packet containing a set of instructions (Appendix B), an information questionnaire (Appendix A), the "Semantic Differential" measuring the concept of industrial arts, and a "Semantic Differential" measuring the concept of a particular area in industrial arts (Appendix D, E, F, G, and H).

Procedures for Analysis of Data

At the termination of the fall semester of 1970, the data were punched into cards and processed by the Data
Processing Center at North Texas State University, Denton, Texas. The statistical treatment used in testing Hypotheses I through IX was the $t$ test of differences between means.

The values of $t$ fluctuated according to sample size, and for this reason, when the sample sizes ($N_1$ and $N_2$) were small, the total degrees of freedom were found by adding the degrees of freedom for each sample: $(N_1 + N_2 - 2)$. To ascertain the required value of $t$ for significance, the "$t$ table" was utilized, and the .05 level was the level of significance upon which the null hypothesis was accepted or rejected.
CHAPTER BIBLIOGRAPHY


CHAPTER IV

PRESENTATION OF THE DATA

Introduction

An analysis of the data was made to determine the effect of industrial arts experiences on changing the attitudes of North Texas State University freshmen toward industrial arts generally and toward specific curriculum areas in industrial arts. In order to test for attitude change in the freshmen enrolled in an introductory industrial arts course, the students were divided into the following fourteen groups: (1) freshmen demonstrating a desire to major in industrial arts, (2) freshmen demonstrating a desire to major in a curriculum area other than industrial arts, (3) freshmen who had been enrolled in industrial arts at the secondary level, (4) freshmen having no formal instruction in the area of industrial arts at the secondary level, (5) freshmen who had been enrolled in only one semester of secondary industrial arts, (6) freshmen who had been enrolled in industrial arts at the secondary level for more than one semester, (7) freshman male students enrolled in one-hundred-level industrial arts courses, (8) freshman female students enrolled in one-hundred-level industrial arts courses, (9) freshmen enrolled in Industrial Arts 106, (10) freshmen enrolled in Industrial
Arts 107, (11) freshmen enrolled in Industrial Arts 121, (12) freshmen enrolled in Industrial Arts 122, (13) freshmen enrolled in Industrial Arts 128, and (14) the entire population of freshman students enrolled in the following one-hundred-level courses offered by the Industrial Arts Department of North Texas State University: Graphic Arts 106, Power Mechanics 107, Woodworking 121, Metalworking 122, and Engineering Drawing 128.

In order to test the tenability of the hypotheses that are presented in Chapter I, the data secured from the freshman industrial arts students were punched into cards and processed by the Data Processing Center at North Texas State University, Denton, Texas. The statistical treatment used in testing the hypotheses was the $t$ test of differences between means. The values of $t$ fluctuated according to sample size, and for this reason, when the sample sizes ($N_1$ and $N_2$) were small, the total degrees of freedom were found by adding the degrees of freedom for each sample: ($N_1$ and $N_2 - 2$). To ascertain the required value of $t$ for significance, the "$t$ table" was utilized, and the .05 level was the level of significance upon which the null hypothesis was accepted or rejected.

Hypothesis I

The "Semantic Differential" was the criterion used to measure attitude change of freshman industrial arts majors
and freshmen who were non-industrial arts majors. The pre-
test and posttest were given to forty-six freshman industrial
arts majors and to seventy-two freshmen who were non-
industrial arts majors. As shown in Table I, the freshman
industrial arts majors had a pretest mean of 146.28 and a

<table>
<thead>
<tr>
<th>Groups</th>
<th>N</th>
<th>Pretest Mean</th>
<th>S.D.</th>
<th>Posttest Mean</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group I</td>
<td>46</td>
<td>146.28</td>
<td>14.13</td>
<td>148.04</td>
<td>14.85</td>
</tr>
<tr>
<td>Group II</td>
<td>72</td>
<td>123.68</td>
<td>19.78</td>
<td>128.20</td>
<td>19.37</td>
</tr>
</tbody>
</table>

posttest mean of 148.04, as compared to the pretest mean of
123.68 and posttest mean of 128.20 registered by the fresh-
men who were non-industrial arts majors. The standard devia-
tion of the pretest for freshman industrial arts majors was
14.13. In contrast, the freshmen who were non-industrial
arts majors on the pretest had a standard deviation of 19.78.
The freshman industrial arts majors had a posttest standard
deviation of 19.78 and freshman non-industrial arts majors
registered a standard deviation of 19.37.

Hypothesis I predicted that there would be no signifi-
cant difference in the attitude change toward industrial
arts by the freshmen who were non-industrial arts majors as compared with freshmen who were majors. A $t$ value of 0.97 was obtained from the mean gain on the pretest and posttest; for a $t$ value to be significant at the .05 level, it must reach a value of 1.96. Therefore, the difference in the mean attitude change of freshman industrial arts majors and freshmen who were non-industrial arts majors was non-significant at the .05 level.

As shown in Table II, those university freshmen enrolled in one-hundred-level industrial arts courses who were majoring in industrial arts had a mean gain of 1.76, as opposed to

<table>
<thead>
<tr>
<th>TABLE II</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEAN GAIN SCORES AND DIFFERENCE OF GROUP I AND GROUP II FROM THE PRETEST TO THE POSTTEST</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Group</th>
<th>Gain Mean</th>
<th>S.D.</th>
<th>Mean Diff.</th>
<th>$t$ Value</th>
<th>Level of Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group I</td>
<td>1.76</td>
<td>9.66</td>
<td>2.76</td>
<td>0.97</td>
<td>.05*</td>
</tr>
<tr>
<td>Group II</td>
<td>4.52</td>
<td>17.69</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Not significant.

the 4.52 mean gain of university freshmen enrolled in one-hundred-level industrial arts courses who were not industrial arts majors. The difference between these two mean gain scores was 2.76 in the direction of the students not majoring in industrial arts. The $t$ value of 0.97 was not significant at the .05 level. Since the $t$ value was not significant, it
may be inferred that the major of a freshman enrolled in a one-hundred-level industrial arts course has no direct relationship with his attitude change toward the concept of industrial arts.

Hypothesis II

The "Semantic Differential" was the criterion used to measure attitude change of students toward industrial arts who were enrolled in secondary industrial arts, as compared with the students who were not enrolled in industrial arts at the secondary level. The pretest and posttest were given to eighty-two freshman industrial arts students who received secondary credit in the curriculum area of industrial arts. The same tests were given to thirty-six freshman industrial arts students who received no formal instruction in secondary industrial arts. As shown in Table III, the students

<table>
<thead>
<tr>
<th>Groups</th>
<th>N</th>
<th>Pretest</th>
<th>Posttest</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean</td>
<td>S.D.</td>
</tr>
<tr>
<td>Group III</td>
<td>82</td>
<td>139.03</td>
<td>19.30</td>
</tr>
<tr>
<td>Group IV</td>
<td>36</td>
<td>117.58</td>
<td>16.40</td>
</tr>
</tbody>
</table>

who received credit for secondary industrial arts had a mean score on the pretest of 139.03 and a mean score of 143.37 on
the posttest. The students who had no formal instruction
in secondary industrial arts registered a much lower mean
score on both the pretest and posttest: on the pretest they
had a mean score of 117.58 and on the posttest a mean of
119.00. In comparing the pretest standard deviation, one
notes that Group III had a standard deviation of 19.30, as
compared to the 16.40 registered by Group IV. The posttest
standard deviation for Group III was 16.37 while Group IV
had a standard deviation of 17.75.

Hypothesis II predicted there would be no significant
difference, as measured by the "Semantic Differential," in
the attitude change toward industrial arts of students who
were enrolled in secondary industrial arts compared with the
students who were not enrolled in industrial arts at the
secondary level. A $t$ value of 0.96 was obtained from the
mean gain on the pretest and posttest. However, for a $t$
value to be significant at the .05 level, it must reach a
value of 1.96. Consequently, the difference in the mean
attitude change of university freshman industrial arts
students who were enrolled in secondary industrial arts was
not significant at the .05 level.

As shown in Table IV, the university freshmen enrolled
in industrial arts who had industrial arts experience at the
secondary level had a mean gain of 4.34. On the other hand,
the university freshmen enrolled in industrial arts who had
no formal industrial arts instruction at the secondary level
had a mean gain of 1.41. The difference between these two mean gain scores was 2.92 in the direction of Group III. The t value of 0.96 was not significant at the .05 level. Since it was not significant, it may be inferred that secondary industrial arts experience is of no substantial consequence in attitude change toward the concept of industrial arts as indicated by university freshmen enrolled in one-hundred-level industrial arts courses at North Texas State University.

**Hypothesis III**

The "Semantic Differential" was the criterion used to measure attitude change of university freshmen enrolled in one-hundred-level industrial arts courses who had one semester of secondary industrial arts and university freshmen enrolled in one-hundred-level industrial arts courses who had more than one semester of secondary industrial arts. The pretest was given to seventeen freshman industrial arts
students who received one semester of secondary industrial arts credit and to sixty-six freshman industrial arts students who were enrolled in secondary industrial arts for more than one semester. As shown in Table V, the freshman

**TABLE V**

**MEANS AND STANDARD DEVIATIONS OF PRETEST AND POSTTEST SCORES OF GROUP V AND GROUP VI**

<table>
<thead>
<tr>
<th>Groups</th>
<th>N</th>
<th>Pretest Mean</th>
<th>Pretest S.D.</th>
<th>Posttest Mean</th>
<th>Posttest S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group V</td>
<td>17</td>
<td>138.00</td>
<td>20.35</td>
<td>143.58</td>
<td>17.55</td>
</tr>
<tr>
<td>Group VI</td>
<td>66</td>
<td>139.15</td>
<td>19.06</td>
<td>143.06</td>
<td>16.21</td>
</tr>
</tbody>
</table>

industrial arts students who were enrolled in secondary industrial arts for one semester had a pretest mean of 138.00 and a posttest mean of 143.58. The freshman industrial arts students who were enrolled in secondary industrial arts longer than one semester had a pretest mean of 139.15 and a posttest mean of 143.06. The standard deviation of the pretest for those industrial arts freshmen enrolled in secondary industrial arts for one semester was 20.35. In contrast, the standard deviation for the industrial arts freshmen who were enrolled in secondary industrial arts longer than one semester was 19.06. The comparison of posttest standard deviations reveals that the freshman industrial arts students who had one semester of secondary industrial arts posted a
standard deviation of 17.55, while the freshman industrial arts students who had more than one semester of secondary industrial arts registered a standard deviation of 16.21.

Hypothesis III predicted there would be no significant difference in the attitude change of students toward industrial arts who were enrolled for one semester of industrial arts at the secondary level, as opposed to those students who enrolled in more than one semester of industrial arts. A t value of 0.39 was obtained from the mean gain on the pretest and posttest; for a t value to be significant at the .05 level it must reach a value of 1.96. Therefore, the difference in the mean attitude change of freshmen enrolled in industrial arts who had only one semester of secondary industrial arts and those freshmen enrolled in industrial arts who had more than one semester of industrial arts was not significant at the .05 level.

As shown in Table VI, the university freshmen enrolled in industrial arts who had industrial arts experience at the

<table>
<thead>
<tr>
<th>TABLE VI</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEAN GAIN SCORES AND DIFFERENCE OF GROUP V AND GROUP VI FROM THE PRETEST TO THE POSTTEST</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Group</th>
<th>Gain Mean</th>
<th>S.D.</th>
<th>Mean Diff.</th>
<th>t Value</th>
<th>Level of Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group V</td>
<td>5.58</td>
<td>15.56</td>
<td>1.67</td>
<td>0.39</td>
<td>.05*</td>
</tr>
<tr>
<td>Group VI</td>
<td>3.90</td>
<td>15.45</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Not significant.
secondary level for one semester had a mean gain of 5.58 as opposed to the 3.90 mean gain of university freshmen enrolled in industrial arts who enrolled for more than one semester of secondary industrial arts. The difference between the two mean gain scores was 1.67 in the direction of the freshmen who were enrolled in secondary industrial arts for one semester. The $t$ value of 0.39 was not significant; therefore, it may be inferred that the length of time spent in a secondary industrial arts program will have no direct bearing on a student's attitude change toward the concept of industrial arts.

Hypothesis IV

The "Semantic Differential" was the criterion used to measure attitude change of freshman male students enrolled in one-hundred-level industrial arts courses and freshman female students enrolled in one-hundred-level industrial arts courses. The pretest and posttest were given to ninety-six freshman male students enrolled in one-hundred-level industrial arts courses and to twenty-two freshman female students who were also enrolled in one-hundred-level industrial arts courses. As shown in Table VII, the freshman male students enrolled in one-hundred-level industrial arts courses had a pretest mean of 136.16 and a posttest mean of 140.77. The freshman female students enrolled in one-hundred-level industrial arts courses were in sharp contrast,
TABLE VII
MEANS AND STANDARD DEVIATIONS OF PRETEST AND POSTTEST SCORES OF GROUP VII AND GROUP VIII

<table>
<thead>
<tr>
<th>Groups</th>
<th>N</th>
<th>Pretest</th>
<th></th>
<th>Posttest</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean</td>
<td>S.D.</td>
<td>Mean</td>
<td>S.D.</td>
</tr>
<tr>
<td>Group VII</td>
<td>96</td>
<td>136.16</td>
<td>20.29</td>
<td>140.77</td>
<td>17.67</td>
</tr>
<tr>
<td>Group VIII</td>
<td>22</td>
<td>116.45</td>
<td>15.45</td>
<td>114.86</td>
<td>16.78</td>
</tr>
</tbody>
</table>

For they had a pretest mean of 116.45 and a posttest mean of 114.86. The standard deviation of the pretest for freshman male industrial arts students was 20.29. In contrast, the female freshmen enrolled in industrial arts had a pretest standard deviation of 15.45. The comparison of posttest standard deviations discloses that the freshman male students had a standard deviation of 17.67 while the females registered a posttest standard deviation of 16.78.

Hypothesis IV predicted there would be no significant attitude change in freshman male students who are enrolled in freshman-level industrial arts courses toward the concept of industrial arts. A $t$ value of 1.75 was obtained from the mean gain on the pretest and posttest, and for a $t$ value to be significant at the .05 level, it must reach a value of 1.96. Therefore, the difference in the mean attitude change of freshman male students enrolled in industrial arts and freshman female students enrolled in industrial arts was not significant at the .05 level.
As shown in Table VIII, those freshman male students enrolled in industrial arts had a mean gain of 4.60, as opposed to the 1.59 mean gain of university freshman females enrolled in one-hundred-level industrial arts courses. The difference between these two mean gain scores was 6.19 in the direction of the male students. The t value of 1.75 was not significant at the .05 level; and, since it was not significant, it may be inferred that the sex of freshman industrial arts students is of little importance in attitude change toward the concept of industrial arts.

**Hypothesis V**

The "Semantic Differential" was the criterion used to measure the attitude change of freshman industrial arts students enrolled in engineering drawing toward the concept of engineering drawing. The pretest and posttest were given to fifty freshmen who were enrolled in Engineering Drawing
128. As shown in Table IX, they registered a pretest mean of 133.22 and a posttest mean of 135.98. The mean difference,

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>S.D.</th>
<th>Mean Diff.</th>
<th>t Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>133.22</td>
<td>19.50</td>
<td>2.76</td>
<td>1.46</td>
</tr>
<tr>
<td>Posttest</td>
<td>135.98</td>
<td>18.65</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2.76, was in a positive direction. In comparing the standard deviations, one notes that the pretest had a standard deviation of 19.50 and the posttest a standard deviation of 18.65.

Hypothesis V predicted there would be no significant difference in attitude change as indicated by the mean difference obtained by the "Semantic Differential" pretest and posttest toward the concept of engineering drawing as indicated by university freshmen enrolled in engineering drawing. As shown in Table IX, a t value of 1.46 was obtained from the mean gain on the pretest, posttest; and for a t value to be significant at the .05 level, it must reach a value of 1.96. Therefore, the difference in the mean attitude change of freshman engineering drawing students toward the concept engineering drawing was not significant at the .05 level. Since the t value was not significant, it may be inferred
that exposure to an engineering drawing course does not necessarily induce attitude change toward engineering drawing.

Hypothesis VI

The "Semantic Differential" was the criterion used to measure attitude change of freshman industrial arts students enrolled in woodworking. The pretest and posttest were given to eighteen freshmen enrolled in Woodworking 121. As shown in Table X, they registered a pretest mean of 142.83 and a posttest mean of 143.50. The mean difference was 0.66 in a positive direction. The comparison of the standard deviations reveals that the pretest had a standard deviation of 15.89 and the posttest a standard deviation of 13.49.

Hypothesis VI predicted there would be no significant difference in attitude change as indicated by the mean difference obtained by the "Semantic Differential" pretest and posttest toward woodworking as indicated by university

<table>
<thead>
<tr>
<th>Test</th>
<th>Mean</th>
<th>S.D.</th>
<th>Mean Diff.</th>
<th>t Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>142.83</td>
<td>15.89</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Posttest</td>
<td>143.50</td>
<td>13.49</td>
<td>0.66</td>
<td>0.24</td>
</tr>
</tbody>
</table>
enrolled in woodworking. As shown in Table X, a \( t \) value of 0.24 was obtained from the mean gain on the pretest and posttest; and for a \( t \) value to be significant at the .05 level, it must reach a value of 1.96. Since the \( t \) value was not significant, it may be inferred that enrollment in a woodworking course does not necessarily induce attitude change toward the concept woodworking.

Hypothesis VII

The "Semantic Differential" was the criterion used to measure attitude change of freshman industrial arts students enrolled in metalworking toward the concept of metalworking. The pretest and posttest were given to seventeen freshman students who were enrolled in Metalworking 122. As shown in Table XI, they registered a pretest mean of 136.05 and a posttest mean of 143.00. The mean difference was 6.94 and was in a positive direction. In comparing the standard

<table>
<thead>
<tr>
<th>Test</th>
<th>Mean</th>
<th>S.D.</th>
<th>Mean Diff.</th>
<th>( t ) Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>136.05</td>
<td>16.48</td>
<td>6.94</td>
<td>2.20</td>
</tr>
<tr>
<td>Posttest</td>
<td>143.00</td>
<td>14.56</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
deviations the pretest had a standard deviation of 16.48 and the posttest a standard deviation of 14.56.

Hypothesis VII predicted there would be no significant difference in attitude change as indicated by the mean difference obtained by the "Semantic Differential" pretest and posttest toward the concept metalworking as indicated by university freshmen enrolled in metalworking. As shown in Table XI, a t value of 2.20 was obtained from the mean gain on the pretest and posttest; and for a t value to be significant at the .05 level, it must reach a value of 1.96. Therefore, the difference in the mean attitude change of freshman metalworking students toward the concept metalworking was significant at the .05 level. Since the t value was significant, it may be inferred that exposure to one-hundred-level metalworking courses may induce attitude change toward the concept of metalworking.

Hypothesis VIII

The "Semantic Differential" was the criterion used to measure attitude change of freshman industrial arts students enrolled in graphic arts toward the concept of graphic arts. The pretest and posttest were given to eighteen freshmen who were enrolled in Graphic Arts 106. As shown in Table XII, they registered a pretest mean of 125.38. The mean difference was 3.88 and was in a positive direction. In comparing the standard deviations the pretest had a standard deviation of 21.36 and the posttest a standard deviation of 17.64.
TABLE XII

PRETEST AND POSTTEST SCORES USED TO DETERMINE THE SIGNIFICANCE OF ATTITUDE CHANGE TOWARD THE CONCEPT GRAPHIC ARTS

<table>
<thead>
<tr>
<th>Test</th>
<th>Mean</th>
<th>S.D.</th>
<th>Mean Diff.</th>
<th>t Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>121.50</td>
<td>21.36</td>
<td>3.88</td>
<td>0.90</td>
</tr>
<tr>
<td>Posttest</td>
<td>125.38</td>
<td>17.64</td>
<td>3.88</td>
<td></td>
</tr>
</tbody>
</table>

Hypothesis VIII predicted there would be no significant difference in attitude change as indicated by the mean difference obtained by the "Semantic Differential" pretest and posttest toward the concept graphic arts as indicated by university freshman enrolled in graphic arts. As shown in Table XII, a $t$ value of 0.90 was obtained from the mean gain on the pretest and posttest; and for a $t$ value to be significant at the .05 level, it must reach a value of 1.96. Therefore, the difference in the mean attitude change of freshman graphic arts students toward the concept graphic arts was not significant at the .05 level. Since the $t$ value was not significant, it may be inferred that exposure to a graphic arts course does not necessarily induce attitude change toward graphic arts.

Hypothesis IX

The "Semantic Differential" was the criterion used to measure attitude change of freshman industrial arts students enrolled in power mechanics toward the concept power
mechanics. The pretest and posttest were given to fifteen freshmen who were enrolled in Power Mechanics 107. As shown in Table XIII, they registered a pretest mean of 134.66 and a posttest mean of 133.33. The mean difference was 1.33 and was in a negative direction. A comparison of the standard deviations shows that the pretest had a standard deviation of 16.85 and the posttest a standard deviation of 17.85.

Hypothesis IX predicted there would be no significant difference in attitude change as indicated by the mean difference obtained by the "Semantic Differential" pretest and posttest toward power mechanics as indicated by university freshmen enrolled in power mechanics. As shown in Table XIII, a $t$ value of 0.47 was obtained from the mean gain on the pretest and posttest; and for a $t$ value to be significant at the .05 level, it must reach a value of 1.96. Therefore, the difference in the mean attitude change of freshman power mechanics students toward the concept power
mechanics was not significant at the .05 level. Since the \( t \) value was not significant, it may be inferred that exposure to a power mechanics course does not necessarily induce attitude change toward the concept power mechanics.

Hypothesis X

The "Semantic Differential" was the criterion used to measure attitude change of freshman industrial arts students toward the concept of industrial arts. The pretest and posttest were given in one-hundred-level industrial arts courses. As shown in Table XIV, these students registered

**TABLE XIV**

**PRETEST AND POSTTEST SCORES USED TO DETERMINE THE SIGNIFICANCE OF ATTITUDE CHANGE TOWARD THE CONCEPT INDUSTRIAL ARTS**

<table>
<thead>
<tr>
<th>Test</th>
<th>Mean</th>
<th>S.D.</th>
<th>Mean Diff.</th>
<th>( t ) Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>132.49</td>
<td>20.90</td>
<td>3.44</td>
<td>2.48</td>
</tr>
<tr>
<td>Posttest</td>
<td>135.94</td>
<td>20.17</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a pretest mean of 132.49 and a posttest mean of 135.94. The mean difference was 3.44 and was in a positive direction. The comparison of standard deviations reveals that the pretest had a standard deviation of 20.90 and the posttest a standard deviation of 20.17.

Hypothesis X predicted there would be no significant difference in attitude change as indicated by the mean
difference obtained by the "Semantic Differential" pretest, and posttest toward industrial arts as indicated by university freshmen enrolled in industrial arts. As shown in Table XIV, a $t$ value of 2.48 was obtained from the mean gain on the pretest, posttest; and for a $t$ value to be significant at the .05 level, it must reach a value of 1.96. Therefore, the difference in the mean attitude change of freshman industrial arts students toward the concept industrial arts was significant at the .05 level. Since the $t$ value was significant at the .05 level, it may be inferred that exposure to an industrial arts curriculum may induce an attitude change toward the concept of industrial arts.
CHAPTER V

SUMMARY, FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The purposes of this study were (1) to determine the effect of the industrial arts curriculum on the attitudes of university freshmen toward industrial arts and specific curriculum areas in industrial arts, (2) to determine the degree of attitude difference between industrial arts majors and non-industrial arts majors, (3) to determine if an attitude difference exists in students who were enrolled in industrial arts in high school as opposed to those who received no instruction in industrial arts in the secondary school. The study utilized freshman students who graduated from a secondary school in the spring of 1970, entered freshman classes at North Texas State University in the fall of 1970, were enrolled in Industrial Arts 106, Industrial Arts 107, Industrial Arts 121, Industrial Arts 122, and Industrial Arts 128, and were not previously enrolled in a college or university.

There were 118 freshmen who participated in the study. Of these 118 students, 95 were males and 23 were females: Of this total, 46 were industrial arts majors, while 72 were
non-industrial arts majors. Eighty-two of these students were enrolled in secondary industrial arts as opposed to 36 who were not. Further, 16 were enrolled for one semester of secondary industrial arts, while 66 were enrolled for more than one semester of secondary industrial arts; 50 were enrolled in engineering drawing, 16 were enrolled in woodworking, 18 were enrolled in graphic arts, and 15 were enrolled in power mechanics. The mortality of the freshmen participating in the study was six: this rate was due to either withdrawal from class or failure to participate or respond to the posttest.

The " Semantic Differential " was the instrument used in the study. The " Semantic Differential " was developed by Osgood, Suci, and Tannenbaum, and has been found to be a very sensitive instrument for ascertaining attitude change. The " Semantic Differential " is a rating scale which utilizes a concept measured by several criteria. The criterion is a pair of polar adjectives located at the end of a continuum that is separated in seven equal parts. The equal parts of the continuum were assigned numerical values ranging from one through seven. The most favorable polar adjective was assigned a value of seven; the remaining dashes along the continuum had graduating denominations of one. There are no standard concepts or criterion scales, but for the purpose of this study the concepts are industrial arts, woodworking, metalworking, engineering drawing, graphics, and power mechanics.
The statistical treatment used in testing the ten hypotheses was the $t$ test of difference between means. Some of the sample sizes were small, creating the possibility of a fluctuating $t$ value. For this reason, the total degrees of freedom were found by adding the degrees of freedom for each sample: $(N_1 + N_2 - 2)$. To ascertain the required value of $t$ for significance, the "$t$ table" was utilized, and the .05 level was the level of significance upon which the null hypothesis was accepted or rejected.

Findings

Hypothesis I.—There will be no significant difference as measured by the "Semantic Differential" in the attitude change toward industrial arts of non-industrial arts majors as compared with industrial arts majors. An analysis of the data confirmed the hypothesis that a significant difference did not exist between the mean difference; therefore, the null hypothesis was accepted.

Hypothesis II.—There will be no significant difference as measured by the "Semantic Differential" in the attitude change of students toward industrial arts as compared with the students who were not enrolled in industrial arts at the secondary level. An analysis of the data confirmed that a significant difference did not exist between the mean difference; therefore, the null hypothesis was accepted.
Hypothesis III.—There will be no significant difference as measured by the "Semantic Differential" in the attitude change of students toward industrial arts who were enrolled for one semester of industrial arts at the secondary level as opposed to those students who enrolled in more than one semester of secondary industrial arts. An analysis of the data confirmed that a significant difference did not exist between the mean difference; therefore, the null hypothesis was accepted.

Hypothesis IV.—There will be no significant difference as measured by the "Semantic Differential" in the attitude change of freshman male students toward industrial arts who are enrolled in industrial arts as compared to freshman female students enrolled in industrial arts. An analysis of the data confirmed that a significant difference did not exist between the mean difference; therefore, the null hypothesis was accepted.

Hypothesis V.—There will be no significant difference in attitude change, as indicated by the mean difference obtained by the "Semantic Differential" pretest and posttest, toward engineering drawing as indicated by university freshmen enrolled in engineering drawing. An analysis of the data confirmed that a significant difference did not exist between the mean difference; therefore, the null hypothesis was accepted.
Hypothesis VI.—There will be no significant difference in attitude change, as indicated by the mean difference obtained by the "Semantic Differential" pretest and posttest, toward woodworking as indicated by university freshmen enrolled in woodworking. An analysis of the data confirmed that a significant difference did not exist between the mean difference; therefore, the null hypothesis was accepted.

Hypothesis VII.—There will be no significant difference in attitude change, as indicated by the mean difference obtained by the "Semantic Differential" pretest and posttest, toward metalworking as indicated by university freshmen enrolled in metalworking. An analysis of the data confirmed that a significant difference did exist between the mean difference; therefore, the null hypothesis was rejected.

Hypothesis VIII.—There will be no significant difference in attitude change, as indicated by the mean difference obtained by the "Semantic Differential" pretest and posttest, toward graphic arts as indicated by university freshmen enrolled in graphic arts. An analysis of the data confirmed that a significant difference did not exist between the mean difference; therefore, the null hypothesis was accepted.

Hypothesis IX.—There will be no significant difference in attitude change, as indicated by the mean difference obtained by the "Semantic Differential" pretest and posttest,
toward power mechanics as indicated by university freshmen enrolled in power mechanics. An analysis of the data confirmed that a significant difference did not exist between the mean difference; therefore, the null hypothesis was accepted.

Hypothesis X.—There will be no significant difference in attitude change, as indicated by the mean difference obtained by the "Semantic Differential" pretest and posttest, toward industrial arts as indicated by university freshmen enrolled in industrial arts. An analysis of the data confirmed that a significant difference did exist between the mean difference; therefore, the null hypothesis was rejected.

Conclusions

As a result of this study one major conclusion may be drawn: the present industrial arts curriculum of North Texas State University has no apparent effect on the amount of attitude change toward specific curriculum areas in industrial arts. Because there were no apparent changes in attitude toward most specific curriculum areas, it would seem that a study should be conducted to investigate the methodology and curriculum construction employed in the specific curriculum areas of industrial arts at North Texas State University.

The study, however, in specific curriculum areas indicated that areas of engineering drawing, woodworking,
graphic arts, and power mechanics had a high pretest and posttest mean. Although an attitude change was not significant in these specific curriculum areas it may be noted that the pretest in these areas was extremely high, thus creating a possibility of a homogeneous sample. The relatively high pretest scores and the possibility of homogeneity would make the possibility of attitude change very unlikely. To confirm the supposition of homogeneity, an analysis of the data indicated that in the curriculum areas of engineering drawing, woodworking, and power mechanics the numerical value difference from the pretest to the posttest was no greater than two in any given area. Students in these curriculum areas maintained a favorable attitude toward their respective courses. Although the measured attitude change was not significant, it may be noted that all changes were in a positive direction. The implication is, therefore, that these students were favorably impressed by these specific courses in industrial arts. Although the reason for a student's attitude change was not investigated, the results of the study indicated that the instruction in these areas is capable of maintaining a high attitude, thus implying that the methodology and curriculum are adequate.

An analysis of the data indicated that enrollment in a secondary industrial arts program has little effect upon the attitude changes toward industrial arts, and that the sex of a student has no apparent effect upon the amount of attitude change toward the concept of industrial arts. A review of
the data, however, revealed that of the thirteen groups studied, these two had mean scores significantly lower than the other groups. Consequently, the data indicated that these students' concept of industrial arts was not congruent with that of the remainder of the population. A probable reason for the significant difference in the groups is the preparation in the area of industrial arts prior to enrollment in the university. Consequently, because of the lack of preparation, some students perform inadequately in the classroom. Therefore, is it not conceivable that these students would perform more adequately in special classes, at the freshman level, composed of those students who had no secondary preparation in the area of industrial arts and freshman females?

As indicated by the analysis of the data, the freshmen enrolled in power mechanics at North Texas State University showed no apparent change in attitude toward the concept of power mechanics after a semester of exposure to the course. The pretest had a mean of 134.66 while the posttest had a mean of 133.33. Interpretation of the data indicated that the direction of attitude change was in a negative direction, thus implying that the students' attitude toward power mechanics was less favorable at the end of the semester than it was at the beginning of the semester. Although the attitude change was in a negative direction, it may be noted that the posttest was less than two digits from the pretest.
A justification of the negative reaction to the concept of power mechanics could be made on the basis of a small population. Of the thirteen groups involved in the study, the smallest group was in the area of power mechanics. This small number of students resulted in a leptokurtic distribution of scores. The pretest mean was relatively high. Therefore, the significant change which was observed could be attributed to chance.

It was hypothesized there would be no significant difference in attitudinal change of students toward the concept of metalworking, but the hypothesis was rejected and was found to be significant at the .05 level. Therefore, as indicated by the analysis of the data it was concluded that exposure of one semester of metalworking does induce an attitude change toward the concept of metalworking. Although the implications for attitude change were not investigated, it is believed that the students' significant attitude change may be attributed to the unfamiliarity of the concept on the pretest and a favorable reaction to the methodology and structure of the curriculum. The unfamiliarity with the concept is attributed to the inadequacy of the secondary industrial arts program. Of the concepts measured, all but metalworking are integrated into the secondary industrial arts curriculum. Therefore, most of the university freshmen involved in the study, although they had a high pretest mean, knew less about metalworking than they did of the other curriculum areas in
industrial arts. Consequently, because of lack of formal training, the students were more intrigued by the tools, machines, and process of metalworking.

Recommendations

Based upon the findings and conclusions of this study, further research is recommended in the following areas:

1. A study of attitude change, using the concept of industrial arts and specific curriculum areas in industrial arts, should be conducted, using all freshman-level students enrolled in industrial arts courses at North Texas State University.

2. A study of attitude change, using the concept of industrial arts and specific curriculum areas in industrial arts, should be conducted, using all students enrolled in industrial arts courses at North Texas State University.

3. A longitudinal study, utilizing the freshmen of this study, should be conducted, terminating upon graduation of the freshman class of 1970.

4. Since freshmen who received no formal instruction in secondary industrial arts and freshman female students had a mean score much lower than the other groups, there should be special classes for these students in specific curriculum areas in industrial arts.
APPENDIX A

Questionnaire

1. Name ________________________________
2. Student Number ____________________________
3. Sex: Male _______ Female ______
4. High School Attended ____________________________
5. Date of Graduation From High School ____________________________
6. Have you ever attended a college or university prior to the Fall Semester of 1970? Yes ______ No ______
7. Major ________________________________
8. Check the number of years that you were enrolled in industrial arts in high school.
   a. None ______
   b. One ______
   c. Two ______
   d. Three ______
   e. Four ______
9. List the courses that you are now enrolled in.
   a. ________________________________
   b. ________________________________
   c. ________________________________
   d. ________________________________
   e. ________________________________
   f. ________________________________
   g. ________________________________
APPENDIX B

INSTRUCTIONS

The purpose of this study is to measure your concept of power mechanics and industrial arts. This test will in no way affect your grade. Therefore, please make judgements on the basis of what the adjectives mean to you. On the pages following the instructions you will find the concept industrial arts and power mechanics at the top of the page and below it twenty-five criterion scales.

If you feel that your concept of industrial arts or power mechanics is VERY CLOSELY RELATED to one end of the scale, place an "X" as indicated below.

\[
good: X:\ldots:\ldots:\ldots:\ldots:\ldots:bad
\]

or

\[
good: \ldots:\ldots:\ldots:\ldots:\ldots: X:bad
\]

If you feel that your concept of industrial arts or power mechanics is QUITE CLOSELY RELATED to one end of the scale, please place an "X" as indicated below.

\[
good: \ldots:\ldots:\ldots:\ldots:\ldots: X:bad
\]

or

\[
good: \ldots:\ldots:\ldots:\ldots:\ldots: X:bad
\]

If you feel that your concept of industrial arts or power mechanics is ONLY SLIGHTLY RELATED to one end of the scale, place an "X" as indicated below.

\[
good: \ldots:\ldots:\ldots:\ldots:\ldots: X:bad
\]

or

\[
good: \ldots:\ldots:\ldots:\ldots:\ldots: X:bad
\]
If you feel that your concept of industrial arts or power mechanics is NEUTRAL on a particular scale, place an "X" as indicated below.

**goods: X__i__i__bad**

**IMPORTANT**

1. Do not place more than one check mark on each scale.
2. Do not omit any scales.
3. Do not look back over the scales after you have completed the test.
4. Place your "X" in the middle of the dashes.

**THIS**

**NOT THIS**

**good: X__bad**
INSTRUCTIONS

The purpose of this study is to measure your concept of graphic arts and industrial arts. This test will in no way affect your grade. Therefore, please make judgments on the basis of what the adjectives mean to you. On the pages following the instructions you will find the concept industrial arts and graphic arts at the top of the page and below it twenty-five criterion scales.

If you feel that your concept of industrial arts or graphic arts is VERY CLOSELY RELATED to one end of the scale, place an "X" as indicated below.


or


If you feel that your concept of industrial arts or graphic arts is QUITE CLOSELY RELATED to one end of the scale, please place an "X" as indicated below.


or


If you feel that your concept of industrial arts or graphic arts is ONLY SLIGHTLY RELATED to one end of the scale, place an "X" as indicated below.


or

If you feel that your concept of industrial arts or graphic arts is NEUTRAL on a particular scale, place an "X" as indicated below.

good: ___: ___: ___: ___: X: ___: ___: ___: bad

IMPORTANT

1. Do not place more than one check mark on each scale.
2. Do not omit any scales.
3. Do not look back over the scales after you have completed the test.
4. Place your "X" in the middle of the dashes.

THIS NOT THIS

good: ___: X: ___: ___: ___: ___: ___: ___: bad
APPENDIX B

INSTRUCTIONS

The purpose of this study is to measure your concept of metalworking and industrial arts. This test will in no way affect your grade. Therefore, please make judgments on the basis of what the adjectives mean to you. On the pages following the instructions you will find the concept industrial arts and metalworking at the top of the page and below it twenty-five criterion scales.

If you feel that your concept of industrial arts or metalworking is VERY CLOSELY RELATED to one end of the scale, please place an "X" as indicated below.

<table>
<thead>
<tr>
<th>good:</th>
<th>X:</th>
<th>:_:</th>
<th>:_:</th>
<th>:_:</th>
<th>:_:</th>
<th>:_:</th>
<th>:_:</th>
<th>bad</th>
</tr>
</thead>
</table>

or

| good: |:_: |:_: |:_: |:_: |:_: |:_: |:_: | X : bad |

If you feel that your concept of industrial arts or metalworking is QUITE CLOSELY RELATED to one end of the scale, please place an "X" as indicated below.

<table>
<thead>
<tr>
<th>good:</th>
<th>:_:</th>
<th>X:</th>
<th>:_:</th>
<th>:_:</th>
<th>:_:</th>
<th>:_:</th>
<th>:_:</th>
<th>bad</th>
</tr>
</thead>
</table>

or

| good: |:_: |:_: |:_: |:_: |:_: |:_: | X : bad |

If you feel that your concept of industrial arts or metalworking is ONLY SLIGHTLY RELATED to one end of the scale, place an "X" as indicated below.

<table>
<thead>
<tr>
<th>good:</th>
<th>:_:</th>
<th>:_:</th>
<th>X:</th>
<th>:_:</th>
<th>:_:</th>
<th>:_:</th>
<th>bad</th>
</tr>
</thead>
</table>

or

| good: |:_: |:_: |:_: | X: |:_: |:_: | bad |
If you feel that your concept of industrial arts or metalworking is NEUTRAL on a particular scale, place an "X" as indicated below.


IMPORTANT

1. Do not place more than one check mark on each scale.
2. Do not omit any scales.
3. Do not look back over the scales after you have completed the test.
4. Place your "X" in the middle of the dashes.

    good: : X : bad

    NOT THIS

    good: : X : bad
APPENDIX B

INSTRUCTIONS

The purpose of this study is to measure your concept of woodworking and industrial arts. This test will in no way affect your grade. Therefore, please make judgments on the basis of what the adjectives mean to you. On the pages following the instructions you will find the concept industrial arts and woodworking at the top of the page and below it twenty-five criterion scales.

If you feel that your concept of industrial arts or woodworking is VERY CLOSELY RELATED to one end of the scale, please place an "X" as indicated below.

good: X: __: __: __: __: __: __: __: bad

or

good: __: __: __: __: __: __: __: __: X: bad

If you feel that your concept of industrial arts or woodworking is QUITE CLOSELY RELATED to one end of the scale, please place an "X" as indicated below.

good: __: __: X: __: __: __: __: __: __: __: __: bad

or

good: __: __: __: __: __: __: __: __: X: __: __: __: __: bad

If you feel that your concept of industrial arts or woodworking is ONLY SLIGHTLY RELATED to one end of the scale, please place an "X" as indicated below.

good: __: __: __: __: __: __: __: __: X: __: __: __: __: __: __: __: __: bad

or

good: __: __: __: __: __: __: __: __: __: __: __: X: __: __: __: __: __: __: bad
If you feel that your concept of industrial arts or woodworking is NEUTRAL on a particular scale, place an "X" as indicated below.


IMPORTANT

1. Do not place more than one check mark on each scale.
2. Do not omit any scales.
3. Do not look back over the scales after you have completed the test.
4. Place your "X" in the middle of the dashes.

THIS NOT THIS

APPENDIX 3

INSTRUCTIONS

The purpose of this study is to measure your concept of engineering drawing and industrial arts. This test will in no way affect your grade. Therefore, please make judgments on the basis of what the adjectives mean to you. On the pages following the instructions you will find the concept industrial arts and engineering drawing at the top of the page and below it twenty-five criterion scales.

If you feel that your concept of industrial arts or engineering drawing is VERY CLOSELY RELATED to one end of the scale, place an "X" as indicated below.

\[ \text{good: } X: \quad \text{bad} \]

or

\[ \text{good: } \quad \quad X: \quad \text{bad} \]

If you feel that your concept of industrial arts or engineering drawing is QUITE CLOSELY RELATED to one end of the scale, please place an "X" as indicated below.

\[ \text{good: } X: \quad \text{bad} \]

or

\[ \text{good: } X: \quad \text{bad} \]

If you feel that your concept of industrial arts or engineering drawing is ONLY SLIGHTLY RELATED to one end of the scale, place an "X" as indicated below.

\[ \text{good: } X: \quad \text{bad} \]

or

\[ \text{good: } X: \quad \text{bad} \]
If you feel that your concept of industrial arts or engineering drawing is NEUTRAL on a particular scale, place an "X" as indicated below.

**IMPORTANT**

1. Do not place more than one check mark on each scale.
2. Do not omit any scales.
3. Do not look back over the scales after you have completed the test.
4. Place your "X" in the middle of the dashes.

**THIS**

<table>
<thead>
<tr>
<th>good:</th>
<th>X</th>
<th>bad</th>
</tr>
</thead>
</table>

**NOT THIS**

| good: X | X | bad |
Indicate your concept of INDUSTRIAL ARTS

1. good: _____________: bad
2. strong: _____________: weak
3. dull: _____________: sharp
4. heavy: _____________: light
5. cold: _____________: hot
6. angular: _____________: rounded
7. active: _____________: passive
8. important: _____________: unimportant
9. meaningless: _____________: meaningful
10. interesting: _____________: boring
11. successful: _____________: unsuccessful
12. cruel: _____________: kind
13. dirty: _____________: clean
14. kind: _____________: mean
15. ugly: _____________: beautiful
16. terrible: _____________: wonderful
17. order: _____________: disorder
18. narrow: _____________: wide
19. valuable: _____________: worthless
20. positive: _____________: negative
21. hazy: _____________: clear
22. impractical: _____________: practical
23. pleasant: _____________: unpleasant
24. hindering: _____________: helpful
25. dishonest: _____________: honest
APPENDIX D

Indicate your concept of WOODWORKING:

1. meaningless: ___________: meaningful
2. order: ___________: disorder
3. hazy: ___________: clear
4. good: ___________: bad
5. dull: ___________: sharp
6. terrible: ___________: wonderful
7. angular: ___________: rounded
8. dishonest: ___________: honest
9. hindering: ___________: helpful
10. strong: ___________: weak
11. successful: ___________: unsuccessful
12. heavy: ___________: light
13. cold: ___________: hot
14. pleasant: ___________: unpleasant
15. valuable: ___________: worthless
16. positive: ___________: negative
17. impractical: ___________: practical
18. kind: ___________: mean
19. active: ___________: passive
20. narrow: ___________: wide
21. ugly: ___________: beautiful
22. important: ___________: unimportant
23. interesting: ___________: boring
24. cruel: ___________: kind
25. dirty: ___________: clean
APPENDIX 3

Indicate your concept of METALWORKING

1. meaningless: ____________: meaningful
2. order: ____________: disorder
3. hazy: ____________: clear
4. good: ____________: bad
5. dull: ____________: sharp
6. terrible: ____________: wonderful
7. angular: ____________: rounded
8. dishonest: ____________: honest
9. hindering: ____________: helpful
10. strong: ____________: weak
11. successful: ____________: unsuccessful
12. heavy: ____________: light
13. cold: ____________: hot
14. pleasant: ____________: unpleasant
15. valuable: ____________: worthless
16. positive: ____________: negative
17. impractical: ____________: practical
18. kind: ____________: mean
19. active: ____________: passive
20. narrow: ____________: wide
21. ugly: ____________: beautiful
22. important: ____________: unimportant
23. interesting: ____________: boring
24. cruel: ____________: kind
25. dirty: ____________: clean
APPENDIX P

Indicate your concept of GRAPHIC ARTS

1. meaningless: ________ ________ ________ ________ ________ meaningful
2. order: ________ ________ ________ ________ ________ disorder
3. hazy: ________ ________ ________ ________ ________ clear
4. good: ________ ________ ________ ________ ________ bad
5. dull: ________ ________ ________ ________ ________ sharp
6. terrible: ________ ________ ________ ________ ________ wonderful
7. angular: ________ ________ ________ ________ ________ rounded
8. dishonest: ________ ________ ________ ________ ________ honest
9. hindering: ________ ________ ________ ________ ________ helpful
10. strong: ________ ________ ________ ________ ________ weak
11. successful: ________ ________ ________ ________ ________ unsuccessful
12. heavy: ________ ________ ________ ________ ________ light
13. cold: ________ ________ ________ ________ ________ hot
14. pleasant: ________ ________ ________ ________ ________ unpleasant
15. valuable: ________ ________ ________ ________ ________ worthless
16. positive: ________ ________ ________ ________ ________ negative
17. impractical: ________ ________ ________ ________ ________ practical
18. kind: ________ ________ ________ ________ ________ mean
19. active: ________ ________ ________ ________ ________ passive
20. narrow: ________ ________ ________ ________ ________ wide
21. ugly: ________ ________ ________ ________ ________ beautiful
22. important: ________ ________ ________ ________ ________ unimportant
23. interesting: ________ ________ ________ ________ ________ boring
24. cruel: ________ ________ ________ ________ ________ kind
25. dirty: ________ ________ ________ ________ ________ clean
APPENDIX C

Indicate your concept of ENGINEERING DRAWING

1. meaningless: ___________ ___________ ___________ ___________ ___________ meaningful
2. order: ___________ ___________ ___________ ___________ ___________ disorder
3. hazy: ___________ ___________ ___________ ___________ ___________ clear
4. good: ___________ ___________ ___________ ___________ ___________ bad
5. dull: ___________ ___________ ___________ ___________ ___________ sharp
6. terrible: ___________ ___________ ___________ ___________ ___________ wonderful
7. angular: ___________ ___________ ___________ ___________ ___________ rounded
8. dishonest: ___________ ___________ ___________ ___________ ___________ honest
9. hindering: ___________ ___________ ___________ ___________ ___________ helpful
10. strong: ___________ ___________ ___________ ___________ ___________ weak
11. successful: ___________ ___________ ___________ ___________ ___________ unsuccessful
12. heavy: ___________ ___________ ___________ ___________ ___________ light
13. cold: ___________ ___________ ___________ ___________ ___________ hot
14. pleasant: ___________ ___________ ___________ ___________ ___________ unpleasant
15. valuable: ___________ ___________ ___________ ___________ ___________ worthless
16. positive: ___________ ___________ ___________ ___________ ___________ negative
17. impractical: ___________ ___________ ___________ ___________ ___________ practical
18. kind: ___________ ___________ ___________ ___________ ___________ mean
19. active: ___________ ___________ ___________ ___________ ___________ passive
20. narrow: ___________ ___________ ___________ ___________ ___________ wide
21. ugly: ___________ ___________ ___________ ___________ ___________ beautiful
22. important: ___________ ___________ ___________ ___________ ___________ unimportant
23. interesting: ___________ ___________ ___________ ___________ ___________ boring
24. cruel: ___________ ___________ ___________ ___________ ___________ kind
25. dirty: ___________ ___________ ___________ ___________ ___________ clean
APPENDIX H

Indicate your concept of POWER MECHANICS

1. meaningless: ______:________:________:________:________:________:meaningful
2. order: ______:________:________:________:________:________:disorder
3. hazy: ______:________:________:________:________:clear
4. good: ______:________:________:________:________:bad
5. dull: ______:________:________:________:________:sharp
6. terrible: ______:________:________:________:________:wonderful
7. angular: ______:________:________:________:________:rounded
8. dishonest: ______:________:________:________:________:honest
9. hindering: ______:________:________:________:________:helpful
10. strong: ______:________:________:________:________:weak
11. successful: ______:________:________:________:________:unsuccessful
12. heavy: ______:________:________:________:________:light
13. cold: ______:________:________:________:________:hot
14. pleasant: ______:________:________:________:________:unpleasant
15. valuable: ______:________:________:________:________:worthless
16. positive: ______:________:________:________:________:negative
17. impractical: ______:________:________:________:________:practical
18. kind: ______:________:________:________:________:mean
19. active: ______:________:________:________:________:passive
20. narrow: ______:________:________:________:________:wide
21. ugly: ______:________:________:________:________:beautiful
22. important: ______:________:________:________:________:unimportant
23. interesting: ______:________:________:________:________:boring
24. cruel: ______:________:________:________:________:kind
25. dirty: ______:________:________:________:________:clean
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Unpublished Materials

