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LEARNING ACTIVITIES PROVIDE FOR JUNIOR HIGH
SCHOOL INDUSTRIAL ARTS GOALS AND HUMAN
DEVELOPMENTAL TASKS.

IOWA STATE UNIVERSITY, PH.D., 1978
A study to determine if industrial arts learning activities provide for junior high school industrial arts goals and human developmental tasks

by

Herbert Frederick Wedig

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CHAPTER I. INTRODUCTION

Scholars throughout history have expressed the social and individual importance of education. The task of educating individuals in this society has been entrusted to a school system with a general education curriculum.

The purpose of education has been discussed by various educators. In 1918 the Commission on the Reorganization of Secondary Education set forth the seven Cardinal Principles of Secondary Education in an effort to define the broad scope of the school system. These principles were reaffirmed again in 1961 by the Educational Policies Commission of the National Education Association. In 1944 the Ten Imperative Needs of Youth were presented which expressed the purposes of education in terms of student needs. Wilber and Pendered (1967) summed up many of these efforts in the following three basic purposes:

1. To transmit a way of life.
2. To improve and reconstruct that way of life.
3. To meet the needs of individuals (p. 4).

The idea that one of the purposes of education is to meet the needs of individuals was further explained by Clark, Klein, and Burks (1972):

If the curriculum is to be adequate for all pupils, it must provide many different experiences and content so arranged that each pupil can select the experiences best suited for his particular
needs. At the same time it must also provide common experiences and content so as to meet the needs that youths have in common (p. 59).

It can be seen from this discussion that meeting students' needs is not an easy task for the school. Which needs are common to all students? How can a school go about meeting each student's individual needs?

Some help at answering these questions could be found by hierarchically grouping and ordering student needs (Maslow, 1943). Basic needs could be met first, thereby allowing the next higher need to be met. Using a commonly accepted basis of human development (Erikson, 1971; Piaget, 1952; Bruner, 1966; Havighurst, 1952) could further ensure that a sound theory for meeting student needs is established. Clark et al. (1972) simplified the problem of meeting student needs by explaining: "Paramount among the needs of youth is the necessity of successfully completing as many developmental tasks as possible" (p. 61). The importance of developmental tasks was also expressed by Havighurst (1957):

There are two reasons why the concept of developmental tasks is useful to educators. First, it helps in discovering and stating the purposes of education in the schools. Education may be conceived as the effort of the society, through the school, to help the individual achieve certain of his developmental tasks. The second use of the concept is in the timing of educational efforts. When the body is ripe, and society requires, and the self is ready to achieve a certain task, the teachable moment has come (p. 5).
Teachers and curriculum developers must realize the importance of developmental tasks to the student. The pupil in the classroom might actually view the learning effort as a combination between accomplishing personal developmental tasks and satisfactorily completing educational program goals. Clark et al. (1972) reaffirmed this point in the following explanation:

In any case, curriculum makers must also understand that boys and girls will spend much of their time trying to complete their developmental tasks whether the school provides for them or not, for these matters are really important to the boys and girls (p. 62).

Thus, it would seem that curriculum should be designed so that the students could accomplish their developmental tasks in the process of achieving more intellectual program goals. Maley (1975) felt that there was no reason that this could not be done in the curriculum and said,

It is possible to develop and structure learning activities based upon individual developmental tasks (p. 244).

The content of the curriculum taught in the school is a reflection of the basic purposes expressed by Wilber and Pendered when applied to the nature of human knowledge. This content is embodied in the goals and broad objectives of school programs. Hopefully, students attain these goals by means of the learning activities and experiences in which they take part. Popham (1975) stressed this point in the
following:

But once more we see that the real hope of the teacher should be to have the students beneficially influenced as a consequence of such instructional activities. The activities are only a means to that end (p. 46).

The ends in this case are the students' behavioral outcomes. These outcomes result from the learning activities designed to help the student accomplish stated behavioral objectives and, in turn, the goals of the educational program.

Unfortunately, educational activities in which students take part do not always provide useful experiences for attaining either program goals or developmental tasks. This criticism has often been expressed about industrial arts programs in general. Dyrenfurth (1976) stated in an article on the inadequacies of industrial arts learning activities at meeting program goals:

The sum of the activities, and objectives attained thereby, that students encounter in their industrial arts classes typically do not add up to the goals ascribed to the program... The path of least resistance is a common way of deciding what activities industrial arts students experience (pp. 177-178).

Maley (1975) explained the present relationship between industrial arts learning activities and developmental tasks.

Industrial arts activities are potentially rich in the means and processes by which individuals may deal in a realistic way with the development of their respective developmental tasks... There have been many fine attempts at program development in industrial arts over the past two decades...
The emphasis on the learner and his or her developmental processes was rarely focused upon (p. 244).

If these criticisms of industrial arts programs are valid it can be assumed that there is a need for change or curriculum improvement in industrial arts. But an expressed need for change in industrial arts programs is by no means new. Universities have discussed change and developed many innovative industrial arts programs. Why, then, are criticisms of industrial arts still so common? The reluctance to change in industrial arts programs must still be stronger than the impetus for improvement.

The reluctance to change is a difficult obstacle to overcome in any curriculum improvement effort. It is often the result of a difference in beliefs between teachers in the field and innovative teacher educators in their "ivory towers". Miller (1967) offered more insight into the problem between teachers and teacher educators:

The status quo, or past and present experiences, may inhibit change in schools. Teachers may feel that present practices have worked so why change. . . . Status quo oriented teacher education programs are considered to be potent factors against change (p. 482).

Trump and Miller (1973) also offered an explanation for the reluctance to change which deals with teachers and teacher educators:
Most teachers tend to teach as they were taught. This trait of emulating behavior places a straitjacket [sic] on the learner whose excellence is judged on his ability to memorize, repeat, and replicate the behavior of the teacher. The whole institutionalized procedure becomes a closed circle (p. 449).

Therefore, the assessment of the current status of learning in industrial arts and the determination of possible causes for reluctance to change constitute areas to be investigated further. The perspective and beliefs of the industrial arts profession with respect to the common learning experiences in public secondary school industrial arts programs offer essential input for program evaluation.

Problem of the Study

The problem of this study was twofold:

1. To determine whether typical industrial arts learning activities provide for the attainment of industrial arts curriculum goals and human developmental tasks appropriate to students.

2. To determine whether industrial arts teacher educators are in agreement with junior high school industrial arts teachers as to their perceptions of developmental tasks and program goals in industrial arts.
Purpose of the Study

The purpose of this study was threefold:

1. To assist the industrial arts profession in determining whether industrial arts classes provide for the attainment of human developmental tasks;

2. To assist the industrial arts profession in determining whether industrial arts classes provide for student acquisition of stated program goals;

3. To provide possible evidence as to the perceived status of industrial arts which would indicate problem areas for program improvement in industrial arts at the junior high school level.

Need for the Study

The need for industrial arts educators to evaluate their curriculum efforts in relation to student needs and the broad goals or objectives of the program has been stressed for some time now. Sommers and Face (1966) wrote a chapter for the American Council on Industrial Arts Teacher Education Yearbook on research related to the achievement of industrial arts objectives. Their findings were:
In sum, research related to the achievement of industrial arts objectives has been scarce, uncoordinated, and has been conducted by graduate students (p. 28).

Since that yearbook, other research has been done in this area. One study, done by Schmitt and Pelley (1966) for the U.S. Office of Education, established a nationwide picture of current industrial arts programs.

Although this study is a status report on industrial arts education in the public secondary schools in the United States, one major fact stands out: The current industrial arts curriculum does not even measure up to the program recommended by the profession 10 to 20 years ago. Yet the new curriculum suggests new structures which would reorganize the instructional content to reflect the technology around emerging subject areas in manufacturing, communications, and power and transportation, electricity/electronics, and research and development.

Massive efforts need to be taken before the new approach to teaching the industrial arts can make much of an impact on the current program and eventually improve the technological literacy of the American public (p. 30).

The important thing for the industrial arts profession to determine is where these massive efforts are needed. Schmitt (1961) identified for research in industrial arts a number of basic problem areas, two of which are:

1. Determining industrial arts experiences commensurate with growth levels of youngsters.

2. Establish curriculum content for programs based on sound educational practices (p. 121).

This suggests the need to evaluate industrial arts curriculum efforts, including broad goals or objectives and
student needs, by analyzing student learning activities. The need for improving the curriculum is stressed by Doll (1974). He presented a number of criteria for evaluating the quality of learning experiences and thereby the quality of the educational program. The following represent a few of the criteria which could be included in a research study:

1. Do the experiences appear to meet the needs of our pupils?
2. Do the experiences accord with the objectives to which we subscribe?
3. Do they fit the life patterns of these particular pupils?
4. Are the experiences "leveled" to meet the developmental level and abilities of the pupils we teach?
5. Taken together, do the experiences provide for attainment of the whole range of objectives? (pp. 145-146).

In order to determine whether the industrial arts curriculum is capable of producing its desired outcomes, further assessment of the present relationship between learning experiences, program goals, and developmental tasks is needed. Without such information, much of the effort that goes into improving the curriculum will be wasted.
Questions and Hypotheses

Questions

1. Do industrial arts student learning activities cover all identified program goals and developmental tasks?

2. Are the number of student learning activities proportionally distributed according to the rated importance of the program goals and developmental tasks?

3. How well does the industrial arts profession feel that industrial arts curriculum attains its program goals and provides for the attainment of student developmental tasks?

The following hypotheses were used to further test the above stated questions two and three.

Research Hypothesis I:

There is no difference between the ratings of industrial arts teacher educators and those of junior high school industrial arts teachers concerning the importance of program goals.

Statistical Hypothesis I:

\[ H_0: \mu_1 = \mu_2 \quad \mu_1 = \text{teachers} \]

\[ H_1: \mu_1 \neq \mu_2 \quad \mu_2 = \text{teacher educators} \]
Research Hypothesis II:
There is no difference between the ratings of industrial arts teacher educators and those of junior high school industrial arts teachers concerning the importance of developmental tasks.

Statistical Hypothesis II:

\[ H_0: \mu_1 = \mu_2 \quad \mu_1 = \text{teachers} \]

\[ H_1: \mu_1 \neq \mu_2 \quad \mu_2 = \text{teacher educators} \]

Research Hypothesis III:
There is no difference between the ratings of industrial arts teacher educators and those of junior high school industrial arts teachers concerning how well the curriculum is attaining program goals.

Statistical Hypothesis III:

\[ H_0: \mu_1 = \mu_2 \quad \mu_1 = \text{teachers} \]

\[ H_1: \mu_1 \neq \mu_2 \quad \mu_2 = \text{teacher educators} \]

Research Hypothesis IV:
There is no difference between the ratings of industrial arts teacher educators and those of junior high school industrial arts teachers concerning how well the curriculum is providing for the attainment of student developmental tasks.
Statistical Hypothesis IV:

\[ H_0: \mu_1 = \mu_2 \quad \mu_1 = \text{teachers} \]

\[ H_1: \mu_1 \neq \mu_2 \quad \mu_2 = \text{teacher educators} \]

Assumptions of the Study

The study was based upon the following assumptions:

1. It was assumed that the activities identified represented the typical student involvement found in industrial arts programs.

2. It was assumed that a comprehensive list of basic human developmental tasks which are appropriate for the early adolescent could be identified within the literature.

3. It was assumed that a comprehensive list of basic program goals for industrial arts could be identified within the literature.

4. It was assumed that the junior high school teachers and teacher educators would respond freely to the items used in collecting the data.

Limitations of the Study

1. The student learning activities were limited to those included in junior high school industrial arts programs.

2. The representation of the industrial arts profession was limited to those junior high school industrial arts teachers who are members of the American Industrial Arts Association and those industrial arts teacher educators who are currently listed in the Industrial Teacher Education Directory (1978).
Procedure

1. A review of the literature was made in relation to industrial arts goals, developmental tasks, and student learning activities.

2. A list of industrial arts junior high school or middle school teachers was obtained from the American Industrial Arts Association.

3. A random sample of twenty-five teachers was selected from the list.

4. Each teacher from the sample was asked to enter on a learning activity-assessment instrument what they considered to be their five best student learning activities. The purpose and brief procedure were given for each activity on the instrument.

5. A panel of four judges was selected to help determine whether the activities were representative of typical industrial arts programs in the public schools.

6. Those activities which were determined to actually represent the present status of industrial arts in the public schools were compiled.

7. A commonly accepted list of industrial arts goals and human developmental tasks for the early adolescent was identified in the literature. These goals and tasks along with the student learning activities, were developed into goal-activity and developmental task-activity surveys.

8. A random sample of one hundred junior high or middle school industrial arts teachers was drawn from the American Industrial Arts Association membership. Fifty of the teachers received the goal-activity survey and the other fifty received the developmental task-activity survey.

9. A random sample of one hundred industrial arts teacher educators was drawn from the 1978 Industrial Teacher Education Directory. Fifty of the teacher educators received the goal-activity survey and the other fifty received the developmental task-activity survey.
10. Each of the four groups in the sample was asked to rate the goals or developmental tasks on their respective surveys according to the following categories:

a. Importance - Rate the program goals or developmental tasks on their importance to junior high school industrial arts classes.

b. Attainment - Rate how well the curriculum is meeting program goals or providing for developmental tasks.

c. Activities - Identify one program goal and one developmental task the student has an opportunity to attain by experiencing each of the learning activities.

11. The data were analyzed in the following manner:

Question 1:

The identification of program goals and developmental tasks with activities was used to produce a frequency count for activities on each program goal and developmental task.

Question 2:

A ranking of the importance of the goals and tasks was compared with a ranking of goals and tasks according to activity frequency counts using Spearman rank-order correlation coefficients.

Question 3:

Averages from the ratings of attainment were used. A ranking of these averages was also compared with importance rankings and activity frequency count rankings using Spearman rank-order correlation coefficients.

Hypotheses:

Averages for the importance and attainment ratings of each goal were used to analyze Hypotheses I and III. Averages for the importance and attainment ratings of each developmental task were used to
analyze Hypotheses II and IV. An analysis of variance was used to determine significant differences between the two group means on ratings.

12. Conclusions were drawn from the findings.

Definition of Terms

Developmental Tasks - A developmental task is a task which arises at or about a certain period in the life of the individual, successful achievement of which leads to his happiness and to success with later tasks, while failure leads to unhappiness in the individual, disapproval by the society and difficulty in later tasks (Havighurst, 1952, p. 2).

Curriculum - In common educational usage the curriculum of the school consists of all the experiences that a young person encounters under the direction of the school (Oliva, 1972, p. 81).

Learning Activities - What students do to learn (Leese, Frasure, and Johnson, 1961, p. 209).

Industrial Arts - Industrial arts as a curriculum area is defined as those phases of general education which deal with technology--its evolution, utilization, and significance--and with industry--its organization, materials, occupations, processes, and products--and with the problems and benefits resulting from the technological and industrial nature of society (Maley, 1973, p. 47).
Early Adolescence - That period of life comprising the years just prior to pubescence, or the very early stages of pubescence (Carter, 1945, p. 304).
CHAPTER II. REVIEW OF THE LITERATURE

The purpose of this chapter is to examine the writings and research related to the purposes of industrial arts and the needs of students. The review of literature is divided into three major parts: industrial arts goals and broad objectives, developmental tasks for the early adolescent, and student learning activities.

Industrial Arts Goals and Broad Objectives

The first section of the review of the literature will concentrate on the goals of industrial arts. The review will also assist in the determination of criteria for the selection of current goals in industrial arts programs.

Industrial arts goals

When referring to the purposes, goals, and objectives of an educational program, definitions of these terms are needed. Carrel (1972) defined some of the basic differences in the terms as follows:

The word "purposes" implies a settled, mental determination of mission or reason for a things being. A purpose precedes a things being and provides the basis for its existence. The word "objective" implies something more specific, tangible, and immediately attainable, something resulting from action (p. 57).
He goes on to explain that oftentimes educators merely think in terms of existing courses and programs and assume the validity of education purposes. Since educational experiences are then derived only from what can be learned within these courses and programs the system is "self-perpetuating". Carrel explains that educational purposes "serve as the prime rationale for program development, guidelines for teachers, and fundamental standards for evaluation" (p. 57).

This is not to say that educational purposes are utilized as criteria for educational evaluation. Purposes and goals serve to help plan the curriculum while objectives are the means by which educational programs are evaluated. This is evidenced by McAshan (1970) and his definitions of the terms:

The term "goals" is used to identify the exact aim, purpose, or end that is to be obtained from any course of action or in any behavioral situation. . . . A performance objective refers to any specifically stated objective that identifies a goal and specifies some type of performance, instrumentation, or other evaluation strategy that will furnish evidence that the intended outcome of the goal has or has not been achieved (pp. 15-19).

Even though educational purposes are the basis for a program they are subject to change. Doll (1974) comments on utilizing educational purposes and resulting goals for evaluating curriculum:
Beliefs about the role and purpose of a school or school system appear in statements of philosophy, aims, and objectives. These beliefs should be restated occasionally in revised form to help prevent the school or school system from stumbling along without direction under changing social conditions (p. 292).

Many changes in social conditions have been brought about by the rapid growth of scientific and technological knowledge (Feirer, 1970). Mays (1950) explained the effects of these changes:

... the significant feature of underlying theories and principles of industrial arts education is that they are not static but evolving (p. 571).

These change factors, he explained, serve to necessitate a change or evaluation of existing educational purposes and resulting goals.

Although advancing social conditions have necessitated changing or evaluating the purposes and goals of industrial arts programs, very few of these changes have been implemented in classrooms on a large scale. Olson (1963) pointed this out by stating that the "goals, objectives, and purposes for industrial arts have been studied and proclaimed for half a century. Those expressed in the earlier concepts have remained essentially unchanged through the years" (p. 161).

The first committee formed to study the broad objectives of industrial arts was the committee on "Standards of Attainment in Industrial Arts Teaching". Established in 1928 by
the American Vocational Association (AVA), it identified twelve objectives which generally described what students should know and be able to do. The objectives were revised in 1934 and 1939 but they remained essentially the same until 1946 when another list of nine objectives was developed. These were revised in a 1953 publication.

In three studies conducted by different researchers, the AVA objectives and similar research methods were utilized. Talkington (1962), Hawse (1964), and Backus (1968) all analyzed ratings of the nine 1953 AVA objectives by means of a Q-Sort method in the states of Colorado, Illinois, and Texas. Talkington concluded that although industrial arts teachers in Colorado and prominent national persons in industrial arts ranked three of the goals the same, there was no unity of direction for industrial arts objectives on a state or national level. Backus on the other hand, found that there was a common order of importance attached to the objectives by industrial arts teachers in Illinois, Colorado, and Texas. As a result of these studies the nine goals were recommended to be rank ordered by importance as follows:

1. Habits of orderly performance
2. Shop skills and knowledge
3. Drawing and design
4. Appreciation and use
5. Health and safety
6. Interest and achievement
7. Cooperative attitudes
8. Self realization and initiative
9. Interest in industry

In another study the objectives of industrial arts were examined with respect to certain selected sociological factors of contemporary American society (Miller, 1961). Miller's findings indicated that industrial arts education had no clear set of original objectives. Instead he found that the nine AVA goals were generally accepted nationally, advocated by seventeen states as written, and favored by eleven states with their own goals. He concluded that the AVA goals were not consistent with the definitions of industrial arts and that they reflected the influence of manual arts, and even manual training.

Burns (1975) investigated the perceived objectives of the industrial arts curriculum among Mississippi principals, counselors, industrial arts teachers, and industrial arts teacher educators. The nine AVA objectives were rated by order of their importance and attainment. He found no significant differences in the groups' ratings of importance. Each of the nine objectives was considered "very important", but no ratings of attainment were as high as the perceived importance.
In 1968 the American Vocational Association published *A Guide to Improving Instruction in Industrial Arts*, a bulletin which revised the original nine broad objectives into five goals. It explained that "in essence, the question of legitimate goals and subject areas would seem to be unsettled at this time" (p. 9). The five goals advocated, which were believed unique to industrial arts, were:

1. Develop an insight and understanding of industry and its place in our culture.

2. Discover and develop talents, aptitudes, interests, and potentialities of individuals for the technical pursuits and applied sciences.

3. Develop basic skills in the proper use of common industrial tools, machines, and processes.

4. Develop an understanding of industrial processes and the practical application of scientific principles.

5. Develop problem-solving and creative abilities involving the materials, processes, and products of industry (pp. 9-11).

Baier (1973) analyzed the ratings of industrial arts teachers, counselors, and principals in Colorado on the importance of the AVA's 1953 and 1968 goals. His findings were not in agreement with the findings of Talkington, Hawse and Backus. In this study, the 1953 goals placed in the upper, middle, and lower third of a rank order. "Self-realization and initiative", "health and safety", and "interest in achievement" were the goals in the upper third;
"appreciation and use", "habits of orderly performance", and "shop skills and knowledge" were in the middle; and "interest in industry", "cooperative attitudes", and "drawing and design" ranked in the lower third. In importance the 1968 goals ranked from high to low as follows: 1) "understanding of industrial processes", 2) "problem solving", 3) "discover and develop talents", 4) "insight and understanding of industry", and 5) "basic skills in the proper use of tools". Baier also found that Colorado industrial arts teachers, counselors, and principals agreed that the AVA's 1953 statement of goals was more descriptive of industrial arts programs as they existed and as they should be taught than the 1968 statement.

Another study dealt with whether or not the priority of the AVA's 1968 goals of industrial arts, as determined by current evaluation models, was the same as the priority of the goals as perceived by industrial arts high school teachers (Nelsen 1975). The findings indicated a discrepancy in the rankings for the goal dealing with problem-solving which was ranked number 1 in the perceived priority and number 4 in the priority calculated from evaluation procedures. Nelsen also found that in evaluation more emphasis was given to skills than was indicated in the respondents' rankings. He concluded that industrial arts high school teachers' evaluation
practices are not in agreement with the emphases they felt should be given to the five goals.

Research related to goals other than those presented by the American Vocational Association publications was almost nonexistent. In a study by Carter (1973) one of the conclusions drawn stated a lack of agreement among Oklahoma industrial arts teacher educators, supervisors, and teachers in regard to goals and objectives of their overall programs. Carter therefore recommended the following list of goals:

1. Develop in each student skill in the safe use of tools and machines.
2. Develop the ability to use tools, materials, and processes to solve technical problems.
3. Facilitate communication and cooperation among individuals while completing class assignments.
4. Assist the student in developing an awareness of design to meet a specific need.
5. Develop in each student an insight and understanding of industry and its place in our society.
6. Discover and develop students' talents in industrial and technical fields.
7. Develop an understanding of requirements, opportunities, and working conditions in technical and industrial fields.

Sucharski (1975) attempted to determine the image of industrial arts perceived by selected Arizona industrial arts teachers as manifested by the rank ordering of three
independent sets of goal statements. The goal sets were representative of the philosophical foundations, present programs, and future directions of industrial arts. Conclusions from the study indicated that there was little agreement among industrial arts teachers when ranking goals pertaining to their perception of an image of industrial arts. The teachers also showed little agreement when rank ordering goals oriented toward the present, less agreement when rank ordering goals oriented toward philosophical foundations, and almost no agreement when rank ordering goals oriented toward the future of industrial arts. The highest priorities for goal statements pertained to safety, skill development, and problem solving, while the lowest priority pertained to the relationship of industry and society and the inter-relationship of industrial arts and other subjects. Sucharski recommended that professional organizations should undertake the promotion of a clearly defined working image of industrial arts.

Efforts at determining a consensus of the purposes and goals upon which industrial arts programs are based have received little attention in the literature. Only two research studies have addressed this issue.

The first study (Atkins, 1974) researched common elements in the roles of industrial arts programs which have evolved
over the years. Comparisons were made between the purposes of industrial arts education before and after 1960. The goals which were found to have dominated over the decades were: 1) occupations, 2) recreation, 3) consumer education, 4) skills, 5) understanding of industry, 6) exploration, 7) personal-social growth, and 8) critical thinking.

Parker (1972) conducted a frequency analysis of common professional literature for philosophical expressions of industrial arts. The following is a rank ordering of the major types of philosophical expressions found in the literature.

1. Industrial arts as "general education",
2. Industrial arts as "understanding industry",
3. Industrial arts as "technology",
4. Industrial arts as "industry and technology",
5. Industrial arts as "occupational education",
6. Industrial arts as "understanding our culture",
7. Industrial arts as "art", and
8. Industrial arts as "general education including skills".

Parker compared this rank ordering of expressions with a rank ordering of the same terms by groups of industrial arts teacher educators. He concluded that there was a significant relationship between philosophical expressions as expressed in periodicals and the acceptance of these
expressions by groups of industrial arts teacher educators. There were no differences of philosophical expression rankings between the groups of industrial arts educators.

Suess (1972) in an article entitled "The Industrial Arts Curriculum for the Early Adolescent", expressed a different concern in relation to the industrial arts profession. He stated that:

A more subtle factor that has impeded unified programs is the lack of consensus within the industrial arts profession. The oft-cited failure of the American industrial Arts Association to publish a list of objectives for industrial arts is symptomatic of the lack of consensus within the profession. Little can be said about contemporary programs other than the fact that they are still dominated by woodworking, drafting, and general industrial arts (what ever that is) just as they were when Schmitt and Pelley (1966) conducted their study ten years ago (p. 142).

Though the American Industrial Arts Association did not publish a formal listing of industrial arts goals it did put out a bulletin in 1976 entitled Industrial Arts: A Means of Preparing Youth to Understand and Contribute to our Industrial-Technological Society. A list of the opportunities provided to students through the unique contributions of an industrial arts program were presented:

1. Develop an insight and understanding of industry, its place in our society, and the free enterprise system.

2. Discover and develop individual talents, aptitudes, interests, and potentials as related to industry and technology.
3. Develop an understanding of industrial processes and the practical application of scientific principles.

4. Develop basic skills in the proper use of common industrial tools, materials and processes.

5. Develop problem-solving and creative abilities involving the materials, processes, and products of industry.

6. Develop an understanding of industrial and technological career opportunities and their requirements and develop those traits which will help students obtain and maintain employment (p. 5).

Wilber and Pendered (1967) in their book *Industrial Arts in General Education*, presented objectives which they felt justified the purposes of industrial arts and thereby the role of industrial arts in general education. The objectives presented are as follows:

1. To explore industry and American industrial civilization in terms of its organization, raw materials, processes and operations, products, and occupations.

2. To develop recreational and avocational activities of a constructional nature.

3. To increase an appreciation for good craftsmanship and design, both in the products of modern industry and in artifacts from the material cultures of the past.

4. To increase consumer knowledges to a point where students can select, buy, use, and maintain the products of industry intelligently.

5. To provide information about, and insofar as possible, experiences in the basic processes of many industries in order that students may be more competent to choose a future vocation.
6. To develop critical thinking as related to the materials, tools, and processes of industry and to encourage creative expression in terms of industrial materials.

7. To develop desirable social relationships, such as cooperation, tolerance, leadership and followership, and tact.

8. To develop safe working practices.

9. To develop a degree of skill in a number of basic industrial processes (p. 53).

Olson (1963) also presented a compact statement of objectives for industrial arts in his book *Industrial Arts and Technology*. The objectives were as follows: "1) technical competence, 2) occupational orientation, 3) consumer competence, 4) recreational liberation, 5) cultural appreciations, 6) social competence" (p. 188).

Another list of industrial arts goals was proposed by the American Council of Industrial Arts Supervisors (1972). These goals were given in relation to the growing middle school movement and classified according to the following titles: 1) management organization, 2) social relations, 3) tools, 4) materials, 5) career information, 6) problem solving, 7) consumer knowledge, 8) health and safe practices (p.14).

After extensive surveying and summarizing of previously established goals and objectives by recognized authorities in the field, the United States Office of Education selected a
list of four broad objectives. These objectives were published in a 1960 report entitled *Improving Industrial Arts Teaching*:

1. To develop in each student an insight and understanding of industry and its place in our culture.

2. To discover and develop talent of students in the technical fields and applied sciences.

3. To develop technical problem solving skills relative to materials and processes.

4. To develop in each student a measure of skill in the use of the common tools and machines (pp. 3-18).

Suess (1972) explained that an informal picture of the actual situation in industrial arts could be obtained by examining the catalogs of firms that supply equipment and textbooks to the field. From this analysis, Suess concluded that programs which constitute the present status of industrial arts seem to be "traditional" in nature. He explained that little information has been published to clarify the current status of industrial arts" (p. 116). In an effort to define the nature of "traditional" industrial arts programs, Suess identified three different categories:

Traditional industrial arts programs for the early adolescent may be classified in three categories... skills emphasis programs; pre-vocational emphasis programs; and leisure-time emphasis programs (p. 117).
Selection of current industrial arts goals

On the basis of the research studies, writings, and lists of industrial arts goals, criteria were established for the selection of goals relative to current industrial arts programs. They are as follows:

1. Those goals selected should cover the three categories identified by Suess (1972);

2. Those goals selected should reflect the purposes identified by the American Industrial Arts Association and the American Vocational Association (1968);

3. Those goals selected should represent the typical purposes of industrial arts programs in the United States;

4. Those goals selected should be presented frequently in the professional literature.

The following industrial arts goals were selected for use in this study using the review of the literature and the criteria presented:

1. Develop an insight and understanding of industry and its place in our culture;

2. Discover and develop talents, aptitudes, interests, and potentialities of individuals for the technical pursuits and applied sciences;

3. Develop an understanding of industrial processes and the practical application of scientific principles;

4. Develop basic skills in the proper use of common industrial tools, machines, and processes;
5. Develop problem-solving and creative abilities involving the materials, processes, and products of industry;

6. Develop an understanding of industrial and technological career opportunities and their requirements;

7. Develop interest in industrial-technical areas which will lead to wise and enjoyable use of leisure time.

8. Develop those traits which will help students to obtain and maintain employment.

9. Develop an appreciation for good craftsmanship.

10. Develop consumer knowledges to a point where students can select, buy, use, and maintain the products of industry intelligently.

**Developmental Tasks for the Early Adolescent**

This section of the review will focus on some of the needs of students during a specific stage of human development. The literature presented will pertain to early adolescence, and student needs and developmental tasks. The determination of criteria for the selection of developmental tasks for the early adolescent will also be presented.

**Early adolescence**

Many theories which attempt to explain and define that stage of human development known as adolescence have appeared in the literature. The most common approaches could be categorized as biological. One of the earliest biological
writers concerned with adolescence as a distinct phase of human development was Hall (1916), who advanced the theory of recapitulation. Hall believed that the biological growth and development of humans paralleled the evolution of mankind throughout history. The direction of development was controlled within the individual by genetic forces that had been established by past developments of the human race. For example, infancy was related to the prehistoric stages of the human race. Hall saw early adolescence as parallel with a time in history when man was beginning to develop various disciplines in skill development and cognitive function. Late adolescence represented a recapitulation of the beginning of modern civilization.

Tanner (1969) defined adolescence in terms of bodily changes. Adolescence was characterized as a period of rapid growth and development in the reproductive, muscular, and skeletal systems of the body. The sudden development of these systems often caused the individual to appear awkward and feel like an adult in a child's body. Individuals also developed at different rates beginning at different chronological ages causing a large variance in the "average" development of an adolescent.

Another biological approach to adolescent development was presented in the theory of body types (Sheldon and Stevens, 1940; Harsh and Schrickel 1959). This theory dealt
with relationships between body build and an individual's temperament. Adolescence was characterized as a developmental phase with "schizoid" characteristics and hypothesized to be correlated with a particular body type. A lean, slender body type was thought to experience a very turbulent adolescence, whereas a stocky body type would not experience adolescence with as much difficulty.

Despite large variances in adolescent development Hurlock (1956) defined adolescence in chronological terms. Adolescence was determined to be the period from thirteen to twenty-one years of age. The ages thirteen through sixteen was associated with the early adolescent. Schenck (1972) defined the chronological period of early adolescence to be ages ten through thirteen.

Lewin (1948) approached adolescence from a psychological perspective. He saw the period of adolescence as an awareness and widening of the individual's perceived life space. The cognitive structure of the individual was no longer adequate for this increased life space, and therefore a lack of direction and conflicting behavior were experienced. The adolescent was forced into a position of trying to associate with an adult society, but was not yet accepted by that group. The onset of puberty caused the adolescent to re-examine the meaning of one's own body in relation to one's
perceived life space.

Other theories placed more emphasis than Lewin did the influence of the social environment and the interactions between the adolescent and society. Allison Davis (1944), and Havighurst (1952) described adolescence as a period of socialization for the individual. Society defined what goals, values, and behaviors were acceptable and should be required. Associated with adolescence were a set of socialization tasks that were to be completed so that the individual could function at an adult human level of development.

Kingsley Davis (1960) maintained that adolescence represented a developmental phase in which physical maturation progressed much faster than social maturation. According to Davis, society did not extend adult status to an individual until he worked fulltime, controlled reproductive desires through marriage, became independent from parents, and acquired cultural understanding.

Benedict (1950) and Mead (1952) have suggested that very few human traits are universal; they also stated that they did not consider many problems to be inherent in adolescent development. Anthropological theories, such as those subscribed to by Benedict and Mead, result from cross-cultural studies involving both modern society and primitive cultures. They held that specific patterns of cultural conditions
determined whether development took place in stages or was continuous. The cultural prescriptions for age and stage grading in our society contradict gradings from other cultures. These theorists described adolescence in terms of biological and organic changes within the individual. Mead (1965) went on to point out that over the last two decades there had been a downward diffusion of those maturation problems previously ascribed to the adolescent.

Some theorists do not differentiate between adolescence and early adolescence when discussing characteristics of human development (Havighurst, 1952; Tanner, 1969; Sheldon and Stevens, 1940; Lewin, 1948). Others (Popper, 1967; Hass et al„ 1974; Carter, 1945) viewed this distinction as very important in American society especially in the education of early adolescent individuals. This concern was exemplified by the emergence of the middle school. Popper (1967) explained that:

Its pioneers in the United States meant the middle school to serve as a transitional unit between childhood education in the elementary school and later adolescent education in the high school. Pupils between these two stages of maturation, standing at the threshold of puberty, were to be assigned to a middle school (p. 275).

Hass, Bondi, and Wiles (1974) held that there were specific distinctions given to human development which generally corresponded to the school system.
There are a number of generally accepted stages of human development, including infancy, childhood, early adolescence, middle adolescence, and late adolescence. . . . Early, middle, and late adolescence correspond roughly to the middle school, high school, and community college levels of the school (p. 56).

For the purposes of this study, early adolescence will be viewed as a distinct phase of human development usually occurring between the chronological ages of eleven and fifteen. The sixth, seventh, and eighth grades in school will most often comprise this group and its specific student needs.

**Student needs and developmental tasks**

One of the bases from which to develop curriculum is that of student needs (Taba, 1962; Wood, 1960; Hass et al., 1974; Harap, 1924; Crosby, 1964; Tyler, 1949). These needs are expressed in many ways in the literature, and they are usually identified by analyzing the basic needs of humans. Thomas (1923) expressed the following headings for student needs: new experiences, security, response, and recognition. Symonds (1934) listed needs as: "to be with others, to gain attention, to gain approval, to be a cause, to attain mastery, security and affection, and to satisfy curiosity" (p. 694). Trow (1950) classified needs as follows: "bodily activity, knowledge, sensory enjoyment, security, mastery, and service" (p.134). Maslow (1954) identified a hierarchical category of
human needs in ascending order of importance as: physiological, safety, belongingness and love, esteem, and self-actualization. Leuba (1961) grouped human needs under the headings of "physical" (food, water, clothing) and "acquired" (approval, attention, and pleasing others). According to Bernard (1971) needs can be discussed under the headings of "organic", such as rest, exercise, protection food, and water; "psychological", which includes those needs imperative for personality integration; and "social", which influence a person's ability to function well in groups. Wilber (1967) presented a categorization of needs similar to Bernard's. Wilber identified two major headings: "individual needs" and "group needs". Subheadings for the individual needs were listed as: biological, psychological, and sociological.

The psychological and sociological needs of students give rise to and are exemplified by tasks which must be dealt with by the student for satisfactory human development. Bernard (1971) explained these developmental tasks further when he stated:

Developmental tasks are learnings that are requisite to effective contemporary processes of adjustment and that prepare one for the succeeding stages of growth. They are learnings that must be accomplished in a restricted time period. Developmental tasks arise from the (1) psychological and (2) physiological nature of man as he lives in a particular (3) cultural milieu. These tasks constitute needs of the adolescent, just
as surely as the need for love, for food, for accomplishment, and the like form the basis for behavior (p. 61).

Havighurst (1972) defined formal education as a procedure set up by society to help children achieve certain of their developmental tasks. He explained that those developmental tasks which involve the learning of mental skills relate most directly to the school. However, no developmental task can be completely ignored even though the school might have little direct responsibility. The reason for this was that developmental tasks were so closely interrelated that difficulty in one task such as academic work, was often caused by difficulty in some other task ignored by the school. Havighurst also identified other agents which were involved with developmental tasks: the individual, family, peer group, television and other media, religious groups, and the economy.

Lail (1965) conducted a study to give insight into the level of developmental task achievements using empirical evidence gathered from adolescents in grades seven, nine, and eleven. The 240 students in the study represented each of the mentioned grade levels, both sexes, negro and white races, and middle and lower classes. The developmental tasks used in the study were: 1) coming to terms with one's own changing body, 2) growing in relationship with age-mates of both sexes, 3) seeking new types of relationships
with adults, 4) forming a consistent set of values, and 5) exploring of the world of work in terms of looking one's own potentialities, work habits, interests, and skills. She found that students varied significantly in developmental task achievement according to grade level. Middle and lower classes also varied significantly, with the middle class doing better. Black and white races varied significantly on the tasks, with some achieved better by whites and others by blacks. Boys and girls did not differ on developmental task achievement.

In another study Schoeppe and Havighurst (1952) determined whether the tendency to be high in achievement in one task was related to the level of achievement in other tasks at the same age level. They also hypothesized that there was a positive relationship between levels of achievement on tasks at various periods of adolescence. They used the following five developmental tasks of adolescence in the study: 1) learning an appropriate sex role, 2) achieving emotional independence from parents and other adults, 3) developing conscience, morality, and a set of values, 4) getting along with age-mates, and 5) developing intellectual skills. They found high achievement in one task to be highly related to high achievement in other tasks both at the same age level and at latter periods of adolescence. Evidence
also indicated that the early period of adolescence was the crucial one in which changes in levels of accomplishment of these tasks are taking place; levels of achievement were largely determined by age thirteen on these specific tasks.

Kluge (1956) analyzed how well thirty-one students in two selected environments, a school and a community center, were achieving two developmental tasks related to peer group behavior. The two tasks, 1) achieving new and more mature relations with age mates of both sexes and 2) achieving a masculine or feminine social role, were elaborated by means of behavior trait descriptions of what a well-adjusted sixteen year old should exhibit. He concluded that the middle adolescent peer group follows a predictable pattern of development. One of the recommendations of the study was that all teachers should be able to do a peer culture appraisal in terms of developmental tasks confronting the age group they teach.

Havighurst (1972) did not identify specific developmental tasks for the early adolescent. Instead he listed tasks for adolescents in general as follows:

1. Achieving new and more mature relations with age-mates of both sexes;
2. Achieving a masculine or feminine social role;
3. Accepting one's physique and using the body effectively;
4. Achieving emotional independence of parents and other adults;
5. Preparing for marriage and family life;
6. Preparing for an economic career;
7. Acquiring a set of values and an ethical system as a guide to behavior;
8. Desiring and achieving socially responsible behavior (pp. 45-75).

The list has been changed slightly since its original form was devised in 1948. In the original list Havighurst did not include the sixth task but did include the following adolescent developmental tasks:

1. Developing intellectual skills and concepts necessary for civic competence,
2. Selecting and preparing for an occupation,
3. Achieving assurance of economic independence.

Although Havighurst discussed general changes in American society since 1950 he did not offer any specific explanation of why the lists were different. In the 1972 list the sixth task appears to be a combination of tasks two and three from 1948. It also presents a change of approach in relation to occupational preparation. Related research by Super and Bachrach (1957), Stratemyer, Forkner, and McKim (1947), and Erikson (1950) indicated that adolescent interests which have occupational significance did not start to stabilize until about age sixteen. The developmental task dealing with intellectual
skills and concepts for civic competence was dropped.

A list of developmental tasks identified specifically for the early adolescent was presented by Tryon and Lilienthal (1950). They presented the following ten tasks in relation to ten different categories of behavior:

1. Establishing one's independence from adults in all areas of behavior.
2. Accepting one's self as a worthwhile person, really worthy of love.
3. Behaving according to a shifting peer code.
4. Strong identification with one's own sex mates.
5. Learning one's role in heterosexual relationships.
6. Reorganizing one's thoughts and feelings about one's self in the face of significant bodily changes and their concomitants.
7. Accepting the reality of one's appearance.
8. Controlling and using a "new" body.
9. Using language to express and to clarify more complex concepts.
10. Moving from the concrete to the abstract and applying general principles to the particular (pp. 84-87).

Still another list of developmental tasks for the early adolescent was presented in a document entitled The Maryland Plan: The Junior High School Program in Industrial Arts. In this publication Smith (1970) explained the Maryland Plan developed by Dr. Donald Maley at the University of Maryland. The following developmental tasks were listed as guide posts
for certain educational strategies involved in the Maryland Plan:

1. Establishing independence from adults,
2. Establishing behavior on a strong peer group code,
3. Achieving a broadened base of personal experiences,
4. Achieving effective use of language and communications,
5. Increasing control and use of the body,
6. Expanding mental ability from concrete reasoning into abstract reasoning,
7. Achieving acceptance of self as worthy and valuable person,
8. Learning to control and test emotions,
9. Building and testing a value system,
10. Learning to live in an industrial and democratic culture,
11. Relating to the opposite sex in an approved manner (p.7).

Maley (1975) explained how these developmental tasks could be utilized as a basis for designing educational learning experiences in industrial arts. He utilized Tryon and Lilienthal's list of developmental tasks for the early adolescent to show how:

Industrial arts activities are potentially rich in the means and processes by which individuals may deal in a realistic way with the development of their respective developmental tasks (p. 244).

The teacher should design learning activities so that they
provide for the attainment of various developmental tasks. This could be done in a three-step procedure described by Maley. The first step involved the identification of those developmental tasks which are associated with a given stage of human development, such as in the lists by Havighurst and Tryon and Lilienthal. The second step involved the establishment of a number of general guideline activities that would represent the kinds of activities a student might engage in while striving to achieve the specific developmental tasks identified in step one. The last step involved taking the general guideline activities in step two and developing a set of activities that would be possible in an appropriate kind of industrial arts experience.

**Selection of developmental tasks for the early adolescent**

On the basis of the research and writings relating to adolescence and lists of developmental tasks, criteria were established for the selection of developmental tasks for the early adolescent. They are as follows:

1. Those developmental tasks selected should represent the specific stage of human development known as early adolescence;

2. Those developmental tasks selected should be presented frequently within the related literature;

3. Those developmental tasks selected should arise from the psychological and physiological nature of human beings as they live in United States during the twenty-first century.
The following developmental tasks for the early adolescent were selected for use in this study relative to the review of the literature and criteria presented:

1. Establishing one's independence from adults in all areas of behaviors;
2. Accepting one's self as a worthwhile person;
3. Behaving according to a shifting peer code;
4. Strong identification with one's own sex mates;
5. Learning one's role in heterosexual relationships;
6. Controlling and using a "new" body;
7. Using language to express and to clarify more complex concepts;
8. Moving from the concrete to the abstract and applying general principles to the particular;
9. Building and testing a value system;
10. Organizing thoughts and feelings about one's self based on the reality of one's appearance.

Learning Activities and Industrial Arts

The last section of the review will present literature related to general experiences in the school and experiences in industrial arts that are most beneficial for students. Research and writings will be reviewed in the areas of student learning activities and learning activities in industrial arts.
Student learning activities

Leese, Frasure, and Johnson (1961) defined learning activities as "what students do to learn" (p. 209). This was further explained by Clark, Klein, and Burks (1972) with the following:

How do we learn? We learn through our experiences. Each experience is an interaction with the environment. We learn from what we do to the environment and what the environment does to use (p. 68).

From these definitions it can be assumed that student learning activities are those experiences structured by the school to bring the student into contact with subject matter in such a way that specified learning occurs. These learning activities are the bridge between student and developmental tasks and/or information to be attained.

Evans (1954) conducted a study to determine whether teaching techniques which were compatible with the frames of reference peculiar to the adolescent's social class structure proved effective in assisting students achievement in certain developmental tasks. She concluded that the value of content materials presented in a learning experience were dependent on the learner's reaction to the materials. Also, an adolescent measured the desirability of a learning experience in terms of how it affected one's status in the peer group.

Some general guidelines were given by Maley (1975) to ensure learning activities that provide for developmental
tasks of the early adolescent. These should be considered when developing learning activities regardless of the subject matter being taught. Developmental tasks could be attained if a student:

1. makes decisions regarding work to be done,
2. performs leadership roles among peers,
3. assumes responsibilities for selected activities,
4. functions as a contributing member in one's peer group,
5. engages in problem-solving activities leading to decision making about one's work,
6. plans work on his/her own,
7. carries out tasks with minimal direction by the teacher,
8. helps other classmates with their work,
9. makes selections from a number of alternatives,
10. does independent study on his/her own (pp. 246-247).

Doll (1974) presented a list of findings from research studies in educational psychology which related to educational learning experiences. The list suggests criteria which may be used in determining learning activities that will lead the student to the attainment of selected objectives:

1. Learning experiences should be designed to allow practice of the behaviors which the objective suggests. If the opportunity for practice does not seem to the pupil to be relevant to his view of the objective, he will tend to reject it.
2. Learning experiences should express what the learner believes he is expected to know. The perceived worthwhileness of the experience makes a significant contribution to learning.

3. Learning experiences should sometimes be of the self-activating type. Pupils need opportunities to proceed at their own rate through subject matter which suits them.

4. Learning experiences should be fostered, whenever possible, in intimate face-to-face relationships within small groups. Desirable interaction and learning can apparently be achieved more readily in groups of five to eight members than in groups of thirty to forty.

5. Learning experiences should be as varied as the objectives they represent. There has been too great a tendency to utilize a few kinds of experiences to achieve several objectives. Ingenuity is needed in devising experiences that achieve given objectives (p. 59).

Raths (1971) identified twelve criteria for judging the "worthwhileness" of learning activities. The worthwhileness of an activity was important to students as seen in Doll's summary of research findings. Raths stated that, all things being equal, one activity was more worthwhile than another:

1. If it permits children to make informed choices in carrying out the activity and to reflect on the consequences of their choices.

2. If it assigns to students active roles in the learning situation rather than passive ones.

3. If it asks students to engage in inquiry into ideas, applications of intellectual processes, or current problems, whether personal or social.

4. If it involves children with realia.
5. If completion of the activity may be accomplished successfully by children at several different levels of ability.

6. If it asks students to examine in a new setting an idea, an application of an intellectual process, or a current problem which has been previously studied.

7. If it requires students to examine topics or issues that citizens in our society do not normally examine - and that are typically ignored by the major communication media in the nation.

8. If it involves students and faculty members in "risk" taking - not a risk of life or limb, but a risk of success or failure.

9. If it requires students to rewrite, rehearse, and polish their initial efforts.

10. If it involves students in the application and mastery of meaningful rules, standards or disciplines.

11. If it gives students a chance to share the planning, the carrying out of a plan, or the results of an activity with others.

12. If it is relevant to the expressed purposes of the students (pp. 717-718).

Trump and Miller (1973) expressed the possibility that student learning activities were not providing all those experiences that were needed. In an age of technology and accountability the social needs of students were not being addressed by teachers. They stated that:

Emphasis in today's curriculum is on the development of problem-solving ability for scientific and technical pursuits. Individual competition is stressed in a myriad of ways through competition for scholarships, academic groupings, and prizes for the
intellectual elite. Too little attention is given to balancing these experiences with activities that enable youths to think in terms of social solutions and moral obligations. . . . The unsolved problems of today and tomorrow are related to social behavior (p. 42).

When one considered the education of students who would be living in a future society that could be very different from our own, the Trump and Miller statement seemed even more valid. Toffler (1974) explained the purpose of considering futurism and needed social behaviors further.

The ultimate purpose of futurism in education is not to create elegantly complex, well-ordered, accurate images of the future, but to help learners cope with real life, crises opportunities and perils. It is to strengthen the individual's practical ability to anticipate and adapt to change, whether through invention, informed acquiescence, or through intellectual resistance (p. 13).

From a review of the literature on the role of education in the future, Maley (1977) presented a list of process skills which students needed to attain through learning activities. These process skills were imperative to the social development of students in a changing, complex society. Learning activities should be developed which provided the student:

1. The ability to cope with new and different situations,
2. The ability to anticipate and adjust to change,
3. The ability to do critical thinking,
4. The ability to inquire and make effective analysis of information,
5. The ability to solve problems,
6. The ability to learn how to learn.

Learning activities in industrial arts

Industrial arts programs are in a period of evolution and change as shown in the review of literature on the goals of industrial arts. Learning activities that students experience in order to attain the goals of industrial arts therefore reflect the different directions and to lack of general direction in this field. Dyrenfurth (1976) expressed the opinion that industrial arts instructors frequently selected activities on the basis of three categories: 1) convenience, 2) necessity, and 3) "brownies" (work that directly benefits someone else). Popham (1968) remarked on the relationship between industrial arts goals and resultant learning activities by pointing out that, although the profession ascribed to worthwhile objectives, many teachers were aiming at extremely trivial kinds of pupil behavior changes. Trump and Miller (1973) summed up the lack of direction for industrial arts learning activities by stating:

It is difficult to find agreement on what should be taught. From a perusal of the available curriculum materials, it is reasonable to conclude that industrial arts in the hinterlands has not progressed very far from the concept of teaching basic hand tools and machine processes. Too often, the making of the "take home project" is the ultimate objective (p. 143).
In four studies conducted by different researchers, similar findings resulted. Smith (1965), Russel (1968), Kabakjian (1969), and Bird (1973) each determined the existing status of the respective states of Oregon, Nebraska, Pennsylvania, and Idaho. The largest single unit of content for industrial arts learning activities was found to be woodworking. Other major content areas for learning experiences in industrial arts proved to be general shop, drafting, metals, and crafts.

Kabakjian also found that the individual student project was the most often used method of instruction, while mass production and line production were the least often used methods. Teachers were inclined to use textbooks, reference books, and teacher-made handouts, often giving little attention to concept films, video-tape and closed circuit television.

Russel found that approximately twenty-five percent of the class time was devoted to instructional activities and seventy-five percent to laboratory work. Smith's findings were similar in this respect; his subjects indicated that sixty-three percent of class time is devoted to project construction. Smith also found that teachers strongly favor individual project work, rating its importance at 2.87 on a scale of 3.0.

The American Industrial Arts association in 1976 published a pamphlet entitled *Industrial Arts: A Means of Preparing Youth*
to Understand and Contribute to our Industrial-Technological Society in which the benefits of learning experiences in industrial arts were described and a list of student learning activities that provide these experiences was given. The AIAA stated that learning experiences in industrial arts would:

1. Provide opportunities to identify aptitudes, abilities, and interests meaningful to career selection through mass production, field trips, role playing, custom production, and personnel organization student activities.

2. Promote technical literacy in youth and adults through using tools and materials of industry, identifying processes required to produce constructed and manufactured products, and other student activities.

3. Develop techniques in problem solving through technical reports, planning and constructing projects, simulating industrial techniques and processes, brainstorming, research and development, and other student activities.

4. Develop basic skill in the use of tools and equipment through using hand and power tools and equipment, construction activities, custom production, and mass production student activities.

5. Provide opportunities for reinforcement of learning in other subject areas through researching information and planning; reading, writing, measuring, computing, and discussing during technical application of student activities.

6. Develop safety habits through student activities concerned with safety practices, laboratory safety programs, safety committees, and self-evaluation.

7. Develop attitudes, individual involvement, and a realistic evaluation for consumer awareness through student activities concerned with product evaluation, testing materials, understand
advertising, applying and evaluating finishes, and exploring industrial processes.

8. Provide opportunities for personal and social growth through mass production, club activities, amateur radio, personnel organization, and civic student activities.

9. Contribute to improved recreation through student activities concerning crafts, metalworking, photography, mechanics, plastics, and electronics (pp. 11-15).

Chapter Summary

The review of the literature concerned three main areas relevant to this study: industrial arts goals and broad objectives, developmental tasks for the early adolescent, and learning activities and industrial arts. The review revealed that industrial arts has been undergoing constant evaluation of its expressed purposes, nature of knowledge, and nature of learning.

Research studies concerning the goals of industrial arts were presented along with a comprehensive summary of goal listings related to the current status and perceived purpose of industrial arts. From the review of industrial arts goals, criteria were presented for the selection of those industrial arts goals in this study. A listing of the goals selected was presented.

A review of research and definitions related to the nature of early adolescence was also presented. Student
needs and resulting developmental tasks were discussed in relation to the early adolescent review; a summary of developmental tasks for the adolescent and early adolescent periods was given. From this review, criteria were determined for the selection of developmental task for the early adolescent. A listing of these tasks, to be used in this study, was then presented.

Finally research and theories concerning student learning activities were discussed. Special attention was given to learning activities in industrial arts and their relation to the purposes of this curriculum area.
CHAPTER III. PROCEDURE

This chapter contains a description of the methods and procedures used to determine whether industrial arts learning activities provide for the attainment of developmental tasks and industrial arts goals. It also contains information relative to the methods and procedures for determining whether there were any significant differences between teacher educators and junior high school teachers on their perceptions of developmental tasks and industrial arts goals. The chapter is divided into six major parts: 1) the learning activity-assessment instrument; 2) the learning activity-assessment sampling plan; 3) the goal-activity and developmental task-activity surveys; 4) goal-activity and developmental task-activity sampling plans; 5) analysis of data; 6) summary.

The Learning Activity-Assessment Instrument

A learning activity-assessment instrument was prepared in order to obtain a sample of industrial arts learning activities. The activities identified were to be utilized as a major part of the goal-activity and developmental task-activity surveys. Preparation of the learning activity-assessment instrument included the development, pilot testing, and revision of the instrument.
Instrument development

The learning activity-assessment instrument was developed utilizing the format of Raths and Fanning (1971) for describing student learning activities. This format utilized the following major headings: 1) purpose, 2) procedure, and 3) evaluation. For the purposes of this study the evaluation aspect was omitted since the learning activities were studied only in terms of what the students were doing.

The learning activity-assessment instrument (see Appendix A) consisted of two major parts: 1) the introduction and directions, and 2) the teacher identified learning activities. The first part defined "learning activity" and explained the way in which teachers should determine specific learning activities; it also included an example describing an activity according to the Raths and Fanning format. The second part of the instrument provided two pages on which teachers were to list five activities which they felt best enabled students to fulfill the purposes of the industrial arts program.

Pilot testing

To determine whether the instrument was appropriate for data collection, a pilot test was conducted. The pilot sample consisted of three secondary industrial arts teachers.
Revision of the instrument

The pilot test information was taken into consideration in revising the learning activity-assessment instrument. Spaces provided for teachers' activity lists were enlarged. The direction sheet was changed in order to clarify the meaning, and a section was added which stressed the need for teachers to complete the instrument.

Learning Activity-Assessment Sampling Plan

A sample was selected to represent junior high school industrial arts programs across the United States. This sample was randomly drawn from the population of industrial arts teachers meeting the following criteria:

1. Hold current membership in the American Industrial Arts Association;
2. Be fulltime classroom teacher at the junior high school level or middle school level;
3. Have professional responsibilities directly related to the teaching of industrial arts content area(s).

Junior high school industrial arts teachers

The American Industrial Arts Association membership was used as the basis from which to draw a random sample. This population was thought to reflect the best example of the state of the art and a consistent philosophical base from which industrial arts programs operate. For ease of
discussion the middle school and junior high school will both be referred to by the latter term. This particular level was selected because industrial arts is a commonly accepted part of the junior high school curriculum and is more readily justified at this level in terms of its rationale. The age and academic attainment of the sample is given in Table 1.

Table 1. Age and academic attainment of junior high school teachers selected to receive the learning activity-assessment instrument

<table>
<thead>
<tr>
<th>Number in group</th>
<th>Age range</th>
<th>Academic attainment</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>36% 18-29</td>
<td>52% - Bachelors degree</td>
</tr>
<tr>
<td></td>
<td>36% 30-39</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20% 40-49</td>
<td>48% - Masters degree</td>
</tr>
<tr>
<td></td>
<td>8% 50-59</td>
<td></td>
</tr>
</tbody>
</table>

On their American Industrial Arts Association membership application forms the twenty-five teachers who received this instrument identified a total of seventy areas in which they teach. These teaching areas are listed in Table 2.

Administration of the learning activity-assessment instrument

A learning activity-assessment instrument was mailed to each of the junior high school teachers. A cover letter requesting their participation accompanied the instrument (see
Table 2. Frequency percentages of the various teaching areas identified by junior high school teachers selected to receive the learning activity-assessment instrument

<table>
<thead>
<tr>
<th>Percentage of teachers identifying this responsibility</th>
<th>Teaching areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>25%</td>
<td>Drafting</td>
</tr>
<tr>
<td>19%</td>
<td>Woods</td>
</tr>
<tr>
<td>13%</td>
<td>Metals</td>
</tr>
<tr>
<td>9%</td>
<td>Construction</td>
</tr>
<tr>
<td>9%</td>
<td>Electronics</td>
</tr>
<tr>
<td>6%</td>
<td>Industrial Materials</td>
</tr>
<tr>
<td>6%</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>4%</td>
<td>Plastics</td>
</tr>
<tr>
<td>4%</td>
<td>Power &amp; Transportation</td>
</tr>
<tr>
<td>3%</td>
<td>Graphics</td>
</tr>
<tr>
<td>1%</td>
<td>Ceramics</td>
</tr>
<tr>
<td>1%</td>
<td>Visual Communications</td>
</tr>
</tbody>
</table>

Appendix B). Included was a self-addressed stamped envelope in which the completed instruments were to be returned.

Of the twenty-five teachers, five returned their activity lists within the first ten days. A follow-up letter asking for the completion of the instrument was sent (see Appendix C). Ten more learning activity-assessment
instrument were received bringing the total return to 60% of the original mailing. The ten remaining teachers were telephoned two weeks after the follow-up letter. No additional instruments were received after the phone calls.

The fifteen instruments that were returned contained fifty-nine learning activities. Two of the instruments received were blank with an explanation that these teachers were no longer in the teaching profession. One instrument received was not usable because the teacher did not supply information related to the type of student learning activities requested.

Goal-Activity and Developmental Task-Activity Surveys

A goal-activity survey and a developmental task-activity survey were utilized to collect data to determine whether industrial arts learning activities provide for the attainment of developmental tasks and industrial arts goals. The surveys were used to determine if there were significant differences between teachers educators and junior high school teachers on their perceptions of the importance and attainment of developmental tasks and industrial arts goals. Preparation of the goal-activity and developmental task-activity surveys included the selection of experts, evaluation of the activities, analysis of the experts' ratings, survey
development, and the revision of the survey.

**Selection of the experts**

Four experts (see Appendix D) within the field of industrial arts education were selected to evaluate the learning activities identified by the junior high school teachers. The experts determined whether the activities represented typical industrial arts programs across the country at the present time. The experts were selected upon the following criteria:

1. A current knowledge of junior high school industrial arts curriculum.
2. A broad background in industrial arts education.
3. A familiarity with curriculum development.
4. Employment either at the university level or with a state department of public instruction.
5. A recognized authority on industrial arts education.

**Method used to evaluate the activities**

The fifty-nine learning activities from the completed learning activity-assessment instruments were compiled into a listing to be evaluated by the experts. This listing consisted of a brief introduction, the activities, a check-off system for rating each activity, and an overall evaluation of all the activities.

The experts were given an explanation of the purpose of
the package and directions for its completion. They were asked to read each of the activities and then check either, "Yes, this is a typical industrial arts activity found in the public school" or "No, this is not a typical industrial arts activity found in the public school". The wording of the teachers' original listings was not changed so that the biases of the experimentor would not be introduced. Although no headings were indicated, the activities had been grouped by content areas within the listing to add continuity.

**Analysis of the experts ratings**

The experts' ratings for the activities are summarized in Table 3. This table indicates the number of activities which received various combinations of "No" ratings by the experts.

Table 3. The number of learning activities which various numbers of experts felt were not typical in public school industrial arts programs

<table>
<thead>
<tr>
<th>Number of experts indicating &quot;not typical&quot;</th>
<th>Number of activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>24</td>
</tr>
<tr>
<td>1</td>
<td>14</td>
</tr>
<tr>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>
Based upon these ratings the activities which a majority of the experts rated as "not typical" were dropped. Thus, fourteen activities were eliminated from the goal-activity and developmental task-activity surveys. Of the activities, any which were not considered to be "typical" by two of the experts were reworked as necessary. The experts felt that the activities represented about 86% of the junior high school industrial arts programs in the United States with one standard being equal to about 6 percentage points. Six of the activities were found to provide essentially identical experiences for students as six other activities in the same content area; these six activities were omitted. The total number of learning activities to be used in the goal-activity and developmental task-activity surveys was thirty-nine. A listing of the content areas for the activities is presented in Table 4.

Survey development

The goal-activity and developmental task-activity surveys (see Appendix E) were first developed to comprise a total package. The survey consisted of three major parts; each part was divided into separate sections for goals and developmental tasks. These goals and tasks were selected from a review of the literature.
Table 4. Number of learning activities sampled in various content areas of industrial arts

<table>
<thead>
<tr>
<th>Number of activities</th>
<th>Content areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Woods</td>
</tr>
<tr>
<td>7</td>
<td>Drafting</td>
</tr>
<tr>
<td>1</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>5</td>
<td>Metals</td>
</tr>
<tr>
<td>2</td>
<td>Electricity</td>
</tr>
<tr>
<td>1</td>
<td>Plastics</td>
</tr>
<tr>
<td>1</td>
<td>Graphic Arts</td>
</tr>
<tr>
<td>2</td>
<td>Power Mechanics</td>
</tr>
<tr>
<td>2</td>
<td>Design</td>
</tr>
<tr>
<td>8</td>
<td>Miscellaneous</td>
</tr>
</tbody>
</table>

The first part of the survey considered the importance of industrial arts goals and developmental tasks for the early adolescent. A Likert scale was used to rate the importance of the goals and tasks.

The second part of the survey involved the attainment of industrial arts goals and developmental tasks for the early adolescent. The ratings for goals were determined by how well current junior high school industrial arts programs were attaining these goals. The ratings for developmental
tasks were determined by how well current junior high school industrial arts programs provided for the attainment of these tasks. A Likert scale was used to rate the goals and tasks. This scale was a modification of the needs assessment scale developed through Phi Delta Kappa.

The last section of the survey utilized the thirty-nine learning activities collected. Each learning activity was given a title which corresponded with a list of titles on the answer sheet. The subjects were asked to read the learning activities and then determine the one most prominent goal and task which the student had an opportunity to attain through this learning activity.

Revision of the survey

When all of the materials in the survey had been developed, several revisions were made. The major revision was the division of the survey into two distinct surveys. Each kept the format of the original survey. The goal-activity survey was concerned exclusively with industrial arts goals while the developmental task-activity survey was concerned with developmental tasks for the early adolescent.
Goal-Activity and Developmental Task-Activity
Sampling Plan

The next step in this study involved the selection of a representative sample of individuals responsible for the curriculum in junior high school industrial arts programs. The sample was selected from junior high school industrial arts teachers and industrial arts teacher educators.

**Junior high school industrial arts teachers**

A random sample of one hundred junior high school industrial arts teachers was drawn from the American Industrial Arts Association membership. Fifty of the teachers received the goal-activity survey; the other fifty received the developmental task-activity survey.

**Industrial arts teacher educators**

A random sample of one hundred industrial arts teacher educators was drawn from the *Industrial Teacher Education Directory*, 1977-78, sponsored by the American Council on Industrial Arts Teacher Education and the National Association of Industrial and Technical Teacher Educators. Fifty of the teacher educators received the goal-activity survey; fifty received the developmental task-activity survey. The sample was selected from the directory upon the following criteria:
1. Be a fulltime educator at the college level;

2. Have teaching responsibilities directly related to the technical or professional education of industrial arts teachers.

Administration of the surveys

The following four groups represent the sample for this study:

1. Industrial arts teacher educators who received goal-activity surveys;

2. Junior high school industrial arts teachers who received goal-activity surveys.

3. Industrial arts teacher educators who received developmental task-activity surveys.

4. Junior high school industrial arts teachers who received developmental task-activity surveys.

The goal-activity and developmental task-activity surveys were mailed to each of the respective groups; a cover letter requesting the individuals participation (see Appendix F) accompanied each survey. A self-addressed stamped envelope was included. After two weeks a follow-up letter was sent to those teachers who had not yet responded (see Appendix G). Table 5 represents the number of persons who returned the survey rating sheets.

Of the one hundred goal-activity surveys sent to teacher educators and junior high school teachers 87 were returned, of those returned 86 were usable. Those returned for the developmental task-activity survey numbered 64 and of these
Table 5. Numbers of persons selected to receive the goal-activity and developmental task-activity surveys and numbers of persons returning the survey for each of the groups included in the study

<table>
<thead>
<tr>
<th>Groups and survey</th>
<th>Number selected to receive survey</th>
<th>Number of surveys returned</th>
<th>Number of usable surveys</th>
</tr>
</thead>
<tbody>
<tr>
<td>University goals</td>
<td>50</td>
<td>42-84%</td>
<td>41-82%</td>
</tr>
<tr>
<td>Junior high school goals</td>
<td>50</td>
<td>45-90%</td>
<td>45-90%</td>
</tr>
<tr>
<td>University tasks</td>
<td>50</td>
<td>29-58%</td>
<td>25-50%</td>
</tr>
<tr>
<td>Junior high school tasks</td>
<td>50</td>
<td>35-70%</td>
<td>31-62%</td>
</tr>
</tbody>
</table>

56 were usable. The surveys which were not usable were either incomplete or left blank because the individuals did not feel that they met the criteria for the sample.

Analysis of Data

Once the data had been collected, it was analyzed by computer using the program SPSS Statistical Package for the Social Sciences (Nie, Hull, Jenkins, Steinbrenner, and Bent, 1975). The findings of the analysis are presented in Chapter IV.
Coding the data

For each set of rating sheets returned a record of two computer cards were punched. On the cards was recorded the identification number of the subject, the group represented, the card number, the ten importance ratings, the ten attainment ratings, and the goal or task number for each of the thirty-nine activities.

Computer computations

The following computations were made by the computer for analysis of each of the questions and hypotheses of the study:

1. Frequency counts for each goal, developmental task, and activity;

2. Means and standard deviations for each groups' importance and attainment ratings;

3. Spearman rank order correlation coefficients for comparisons between importance and attainment rankings, importance and activity association rankings, and attainment and activity association rankings;

4. Analyses of variance tests of significance for the groups on importance and attainment ratings.
Chapter Summary

Chapter III provided the detailed information necessary for a thorough understanding of the research procedures used in the study. The learning activity-assessment instrument was reviewed from development through revisions. The purpose of this instrument was to identify junior high school student learning activities. The four experts' validation of the activities was discussed. The development and revisions of the goal-activity and developmental task-activity surveys were reviewed. These surveys were used to test the questions and hypotheses of the study.

A random sample drawn from junior high school teachers who are members of the American Industrial Arts Association received the activity-assessment instrument. Also described was the sampling plan for the following four groups: 1) teacher educators who received the goal-activity survey, 2) junior high school teachers who received the goal-activity survey, 3) teacher educators who received the developmental task-activity survey, and 4) junior high school teachers who received the developmental task-activity survey.

Of the 25 junior high school teachers who received the learning activity-assessment instrument 15 or 60% identified thirty-nine usable student learning activities. Of the 50 goal-activity surveys sent to each group 41 or 82% were
returned in usable form from teacher educators, and 45 or 90% were returned usable form from junior high school teachers. Of the 50 developmental task-activity surveys sent to each group 25 or 50% were returned in usable form from teacher educators and 31 or 62% were returned in usable form from junior high school teachers. Finally, a brief explanation of the analysis of data was presented.
CHAPTER IV. FINDINGS

The findings of this chapter will be reviewed in relation to the following questions:

1. Do industrial arts student learning activities cover all identified program goals and developmental tasks?

2. Are the number of student learning activities proportionally distributed according to the rated importance of the program goals and developmental tasks?

3. How well does the industrial arts profession feel that the industrial arts curriculum attains its program goals and provides for the attainment of student developmental tasks?

Hypotheses which further test the second and third questions will also be presented on the basis of the findings. The chapter has been divided into three major parts, one for each of the questions. Each of the parts is then subdivided into: 1) findings pertaining to program goals and related hypotheses and 2) findings pertaining to developmental tasks and related hypotheses.

Question I

The first question of this study asked whether industrial arts student learning activities provided experiences for all of the program goals and developmental tasks. To answer this question a random sample of thirty-nine industrial arts learning activities were individually matched with the one
most prominent goal and task that the student had an opportunity to attain by experiencing the activity. For purposes of discussion, this question was analyzed in two sections, one for the goal and the other for developmental tasks.

**Industrial arts goals**

The following industrial arts goals were utilized in this study:

1. Develop an insight and understanding of industry and its place in our culture;

2. Discover and develop talents, aptitudes, interests, and potentialities of individuals for the technical pursuits and applied sciences;

3. Develop an understanding of industrial processes and the practical application of scientific principles;

4. Develop basic skills in the proper use of common industrial tools, machines, and processes;

5. Develop problem-solving and creative abilities involving the materials, processes, and products of industry;

6. Develop an understanding of industrial and technological career opportunities and their requirements;

7. Develop interest in industrial-technical areas which will lead to wise and enjoyable use of leisure time;

8. Develop those traits which will help students obtain and maintain employment;

9. Develop an appreciation for good craftsmanship and design;
10. Develop consumer knowledges to a point where students can select, buy, use, and maintain the products of industry intelligently.

To answer the part of Question I that concerned goals, the relationship between learning activities and goals was organized onto a table. Table 6 indicates the number of teacher educators and junior high school teachers (N=86) that identified various goals which could be attained by experiencing each of the thirty-nine learning activities. This table also indicates the total number of times that an activity was associated with a given goal. Since there were eighty-six people rating thirty-nine learning activities, there were a total of 3354 associations between goals and activities. These totals for each goal were then ranked to obtain the goal with which most people associated activities to the goal with which the least activities were associated. A percentage of the total number of possible goal-activity associations is also given for each of the goals.

As can be seen in Table 6, all goals have activities associated with them. The number of activities associated with the different goals varied greatly. The highest ranked goal, "to develop basic skills in the proper use of common industrial tools, machines, and processes", had 1,115 goal-activity associations or 33.3% of all the possible associations. The goal with the least number of goal-activity
<table>
<thead>
<tr>
<th>Goals by number</th>
<th>Activities by Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5 4 1 1 4 14 2 2 3 1 0 2 7 1 0 3 2 7 42 13 2 2 2</td>
</tr>
<tr>
<td>2</td>
<td>3 15 6 11 2 4 13 1 16 4 15 12 15 11 15 13 5 5 1 10 0 4</td>
</tr>
<tr>
<td>3</td>
<td>5 1 10 1 1 14 4 12 7 23 19 8 7 14 9 11 13 17 19 15 17 26</td>
</tr>
<tr>
<td>4</td>
<td>39 32 63.63 51 27 43 44 41 24 20 40 29 37 35 33 5 20 44 60 32</td>
</tr>
<tr>
<td>5</td>
<td>0 18 1 1 5 7 6 14 7 8 17 19 9 15 3 13 3 5 1 5 2 12</td>
</tr>
<tr>
<td>6</td>
<td>0 0 0 0 1 0 0 0 0 1 0 0 4 1 1 0 0 5 13 0 0 0</td>
</tr>
<tr>
<td>7</td>
<td>3 6 1 1 1 3 2 2 2 3 0 5 1 1 3 0 1 0 3 2 1 1</td>
</tr>
<tr>
<td>8</td>
<td>4 1 0 1 1 3 2 2 6 1 2 2 1 8 3 3 5 2 2 2 1 0</td>
</tr>
<tr>
<td>9</td>
<td>3 3 0 0 4 11 8 1 0 1 3 9 2 1 1 3 4 0 1 0 0 0</td>
</tr>
<tr>
<td>10</td>
<td>19 1 0 0 0 9 0 1 1 0 0 0 0 0 0 0 0 0 2 0 1</td>
</tr>
<tr>
<td>11(^a)</td>
<td>5 5 4 4 6 6 6 6 5 4 4 4 11 6 11 6 13 4 3 6 3 8</td>
</tr>
</tbody>
</table>

\(^a\) Not a goal but a rating option of "none of the goals".
<table>
<thead>
<tr>
<th>Activities by Number</th>
<th>Tot.-goal activity assoc.</th>
<th>Rank</th>
<th>% of total assoc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39</td>
<td>193</td>
<td>6</td>
<td>5.7</td>
</tr>
<tr>
<td>13 11 12 6 3 16 21 10 10 2 19 6 13 6 8 12 5</td>
<td>364</td>
<td>3</td>
<td>10.9</td>
</tr>
<tr>
<td>2 36 40 27 30 5 21 28 12 3 1 20 3 12 0 4 1</td>
<td>498</td>
<td>2</td>
<td>14.8</td>
</tr>
<tr>
<td>61 17 14 26 30 12 12 14 9 15 4 8 12 21 0 18 19</td>
<td>1,115</td>
<td>1</td>
<td>33.3</td>
</tr>
<tr>
<td>1 10 8 13 5 13 1 3 25 21 32 31 1 0 0 0 3</td>
<td>338</td>
<td>4</td>
<td>10.1</td>
</tr>
<tr>
<td>0 0 0 0 1 0 0 0 0 0 0 0 0 1 0 44 0 0</td>
<td>72</td>
<td>11</td>
<td>2.2</td>
</tr>
<tr>
<td>2 1 2 2 5 3 2 3 3 17 1 1 3 2 3 7 3</td>
<td>102</td>
<td>9.5</td>
<td>3.0</td>
</tr>
<tr>
<td>1 0 0 1 1 4 2 2 9 2 1 6 13 24 9 18 24</td>
<td>169</td>
<td>7</td>
<td>5.0</td>
</tr>
<tr>
<td>1 0 0 3 1 1 2 1 5 19 19 5 25 0 0 0 1</td>
<td>138</td>
<td>8</td>
<td>4.1</td>
</tr>
<tr>
<td>0 1 1 1 0 22 13 3 3 2 2 3 0 1 0 3 10</td>
<td>102</td>
<td>9.5</td>
<td>3.0</td>
</tr>
<tr>
<td>3 9 4 4 10 7 8 13 8 4 3 5 11 15 6 17 11</td>
<td>263</td>
<td>5</td>
<td>7.9</td>
</tr>
</tbody>
</table>
associations, "to develop an understanding of industrial and technological career opportunities and their requirements" had 72 or only 2.2% of all the possible associations. Therefore, there were 15 times as many activities associated with the highest ranked goal as compared with the lowest ranked goal. The top ranked goal also had over twice as many activities associated with it as the second ranked goal. One rating option with which the individuals could associate activities, "none of the goals", had 7.9% of the activities associated with it and was ranked fifth.

Developmental tasks

The following developmental tasks were utilized in this study:

1. Establishing one's independence from adults in all areas of behavior;
2. Accepting one's self as a worthwhile person;
3. Behaving according to a shifting peer code;
4. Strong identification with one's own sex mates;
5. Learning one's role in heterosexual relationships;
6. Controlling and using a new body;
7. Using language to express and clarify more complex concepts;
8. Moving from the concrete to the abstract and applying general principles to the particular;
9. Building and testing a value system;

10. Organizing thoughts and feelings about one's self-based on the reality of one's appearance.

To determine whether the learning activities provided experiences for all developmental tasks the data was organized another table. This table indicates the number of teacher educators and junior high school teachers (N=56) that selected various developmental tasks which could be attained by experiencing each of the student learning activities. A ranking which was obtained using the total number of times that an activity was associated with a given developmental task. Since there were fifty-six people rating the thirty-nine learning activities, a total of 2184 associations between tasks and activities were possible.

As can be seen in Table 7, there are activities associated with all of the developmental tasks. The highest ranked task, "moving from the concrete to the abstract and applying general principles to the particular", received 393 task-activity associations or 18% of all the possible associations. The lowest ranked task, "organizing thoughts and feelings about one's self based on the reality of one's appearance", received 45 or only 2% of all the possible associations. The rating option for activities associated with "none of the developmental tasks", had 16.8% of the activities
Table 7. Numbers of people that selected various developmental tasks which could be attained by experiencing each of the student learning activities

<table>
<thead>
<tr>
<th>Developmental tasks by number</th>
<th>Activities by Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1848 13 7 4 8 6 3 4 8 6 3 3 0 6 6 4 4 9 2</td>
</tr>
<tr>
<td>2</td>
<td>5 23 9 12 3 9 12 4 7 7 5 6 8 3 2 5 4 10 8 10 6 5</td>
</tr>
<tr>
<td>3</td>
<td>0 0 6 0 1 5 1 4 5 2 2 3 0 9 7 0 3 5 5 2 7 7</td>
</tr>
<tr>
<td>4</td>
<td>2 0 0 0 0 0 1 0 9 3 2 0 1 8 0 7 1 5 2 1 0 0</td>
</tr>
<tr>
<td>5</td>
<td>0 0 1 1 0 1 0 2 8 1 0 0 4 9 0 0 0 12 2 0 0 0</td>
</tr>
<tr>
<td>6</td>
<td>3 1 6 2 1 8 1 6 4 1 7 1 1 1 9 2 2 8 2 1 2 6 2 1 8 1 0 1 4 1 0</td>
</tr>
<tr>
<td>7</td>
<td>1 0 0 0 0 0 1 0 1 1 3 1 2 3 1 7 3 6 7 2 4 0 1 5</td>
</tr>
<tr>
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<td>6 5 7 7 9 1 1 1 1 1 9 1 6 2 2 2 1 6 7 1 1 2 8 7 9 9 7 1 6</td>
</tr>
<tr>
<td>9</td>
<td>1 8 2 0 2 2 7 0 2 3 2 0 4 4 2 4 3 8 3 4 5 1 0</td>
</tr>
<tr>
<td>10</td>
<td>0 0 0 0 1 3 0 1 0 2 1 2 0 0 1 0 0 1 0 1 0 1 1</td>
</tr>
<tr>
<td>11&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1 2 8 8 1 1 8 7 1 2 7 8 6 7 8 6 1 3 8 1 7 4 1 0 1 4 1 1 0</td>
</tr>
</tbody>
</table>

<sup>a</sup>Not a task but a rating option of "none of the developmental tasks".
<table>
<thead>
<tr>
<th>Rank total</th>
<th>Activity assoc.</th>
<th>% of total assoc.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39</td>
<td>12 4 6 4 6 7 3 9 11 4 9 8 6 7 12 9 7</td>
<td>249 4 11.4</td>
</tr>
<tr>
<td>7 4 4 10 7 8 8 3 13 7 17 5 20 3 10 6 10</td>
<td>305 3 14.0</td>
<td></td>
</tr>
<tr>
<td>1 3 6 4 7 2 1 3 3 3 0 10 1 8 0 2 2</td>
<td>130 8 5.9</td>
<td></td>
</tr>
<tr>
<td>1 1 2 1 0 0 0 0 0 5 0 0 1 2 0 1 0</td>
<td>56 10 2.6</td>
<td></td>
</tr>
<tr>
<td>0 0 9 0 0 0 0 1 0 0 1 0 1 4 1 3</td>
<td>61 9 2.8</td>
<td></td>
</tr>
<tr>
<td>14 3 1 9 9 1 2 2 2 0 3 0 1 4 3 1 1 1</td>
<td>248 5 11.9</td>
<td></td>
</tr>
<tr>
<td>2 7 2 2 0 8 7 7 5 5 7 7 1 3 11 2 0</td>
<td>134 7 6.1</td>
<td></td>
</tr>
<tr>
<td>9 22 16 15 7 13 12 10 7 9 10 8 0 1 1 2 2</td>
<td>393 1 18.0</td>
<td></td>
</tr>
<tr>
<td>1 2 3 0 1 7 2 4 8 4 3 6 13 18 5 23 20</td>
<td>196 6 9.0</td>
<td></td>
</tr>
<tr>
<td>0 1 1 0 0 2 1 2 3 0 4 2 3 1 7 2 2</td>
<td>45 11 2.0</td>
<td></td>
</tr>
<tr>
<td>9 9 6 11 19 8 20 16 5 16 6 8 7 9 5 7 9</td>
<td>367 2 16.8</td>
<td></td>
</tr>
</tbody>
</table>
associated with it and was ranked second.

**Question II**

The second question of this study asked whether the number of learning activities was proportionally distributed according to the rated importance of the program goals and developmental tasks. To answer this question rankings for the total number of activity associations were compared with the rankings of importance for the goals and developmental tasks.

The importance rankings were obtained by calculating the mean score for each of the goals and tasks for all of the teacher educators and junior high school teachers. The means were then ranked from highest to lowest. For the purposes of discussion, this question was analyzed in four sections: the first section for goals; the second for Hypothesis I which was related to goal importance; the third for developmental tasks; and the fourth for Hypothesis II which was related to developmental task importance.

**Industrial arts goals**

To determine the importance ranking of the goals, related data was organized as seen in Table 8. This table shows the mean scores for importance of goals as rated by the teacher educators and junior high school teachers (N=86).
Table 8. Mean scores for the rated importance of each program goal and its corresponding rank

<table>
<thead>
<tr>
<th>Goals by number</th>
<th>Mean Score</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8.395</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>8.453</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>7.965</td>
<td>7</td>
</tr>
<tr>
<td>4</td>
<td>8.314</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>8.779</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>7.919</td>
<td>8</td>
</tr>
<tr>
<td>7</td>
<td>7.535</td>
<td>10</td>
</tr>
<tr>
<td>8</td>
<td>7.593</td>
<td>9</td>
</tr>
<tr>
<td>9</td>
<td>8.407</td>
<td>3</td>
</tr>
<tr>
<td>10</td>
<td>8.221</td>
<td>6</td>
</tr>
</tbody>
</table>

*Rated on a ten point scale: (10-9) extremely important, (8-7) important, (6-5) undecided, (4-3) little importance, (2-1) no importance.

All of the goals were rated at different degrees of "importance" on the scale. The highest rated goal, "to develop problem-solving and creative abilities involving the materials, processes, and products of industry", had a mean score of 8.779. The goal rated lowest in importance, "to develop interest in industrial-technical areas which will lead to wise and enjoyable use of leisure time", had a mean
score of 7.535.

To determine whether the number of learning activities was proportionally distributed among the goals according to their perceived importance, the ranking of the number of activity associations was compared with the ranking of importance. In order to compare these two rankings to determine if the goals with the highest importance ratings had the largest number of activities associated with them, a Spearman rank order correlation coefficient was computed. Table 9 shows the two rankings and the corresponding correlation coefficient.

The correlation coefficient of .36 is not significant at the .05 level. Koenker (1961, p. 145) determined that to be significant at the .05 level for an N of 11 the coefficient would have to be at least .55. Therefore there was no relationship between the number of activities associated with each goal and the perceived importance of that goal.

Research Hypothesis I:

It was hypothesized that there was no difference between industrial arts teacher educators and industrial arts junior high school teachers on each of the ratings concerning the importance of goals.

The hypothesis presented combined ratings of goal
Table 9. A comparison of goal importance ranking and number of activities per goal ranking

<table>
<thead>
<tr>
<th>Goals by number</th>
<th>Goal importance ranking</th>
<th>Number of activities per goal ranking</th>
<th>Correlation coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>7</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>8</td>
<td>11</td>
<td>$R_s = .36$</td>
</tr>
<tr>
<td>7</td>
<td>10</td>
<td>9.5</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>9</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>3</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>6</td>
<td>9.5</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>11</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

*Not a goal but a rating option "none of the goals".

importance for the teacher educators and compared them with the combined ratings of goal importance by junior high school teachers. This was done for each of the ten goals. A summary of the analysis of variance tables is seen in Table 10. A complete listing of the analysis of variance tables can be found in Appendix H.
There was a significant difference between the two groups on four of the ten goals. The null hypotheses for goals 2, 3, 5, 7, 9 and 10 was not rejected.

Two of the goals, "to develop an insight and understanding of industry and its place in our culture" and "to develop an understanding of industrial and technological career opportunities and their requirements", had higher means for teacher educators. The F ratios of these goals were also beyond the critical F value at the .05 level. Therefore the teacher educators rated goals 1 and 6 significantly higher in importance than junior high school teachers.

Teacher educators rated the goals "to develop basic skills in the proper use of common industrial tools, machines, and processes" and "to develop those traits which will help students obtain and maintain employment" lower than junior high school teachers according to the means and F ratios. Therefore the teacher educators rated goals 4 and 8 significantly lower in importance than the junior high school teachers.

A Spearman correlation coefficient was computed to compare importance rankings of teacher educators and junior high school teachers. It was found that the two rankings had a -.08 correlation. Therefore, those goals ranked highest in importance by one group were ranked lowest by the other group.
Table 10. A summary of the analysis of variances relating to Hypothesis I

<table>
<thead>
<tr>
<th>Goals by number</th>
<th>Group&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Rank</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>F ratio&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>2</td>
<td>8.795</td>
<td>1.301</td>
<td>5.724*</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>7</td>
<td>8.064</td>
<td>1.50</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>4</td>
<td>8.256</td>
<td>1.140</td>
<td>1.964</td>
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<td>3</td>
<td>1</td>
<td>5</td>
<td>8.205</td>
<td>1.031</td>
<td>2.321</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>8</td>
<td>7.766</td>
<td>1.535</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>8</td>
<td>7.590</td>
<td>1.634</td>
<td>17.955*</td>
</tr>
<tr>
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<td>2</td>
<td>1</td>
<td>8.915</td>
<td>1.265</td>
<td></td>
</tr>
<tr>
<td>5</td>
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<td>1</td>
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<td>.961</td>
</tr>
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<td>2</td>
<td>3</td>
<td>8.660</td>
<td>1.340</td>
<td></td>
</tr>
<tr>
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<td>1</td>
<td>3</td>
<td>8.410</td>
<td>1.482</td>
<td>7.203*</td>
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<td>1</td>
<td>9</td>
<td>7.308</td>
<td>1.719</td>
<td>1.383</td>
</tr>
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<td>9</td>
<td>7.723</td>
<td>1.556</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>10</td>
<td>6.949</td>
<td>2.595</td>
<td>6.266*</td>
</tr>
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<td>6</td>
<td>8.128</td>
<td>1.752</td>
<td></td>
</tr>
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<td>1</td>
<td>7</td>
<td>8.077</td>
<td>1.494</td>
<td>3.911</td>
</tr>
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<td></td>
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<td>2</td>
<td>8.681</td>
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<td></td>
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<tr>
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<td>6</td>
<td>8.180</td>
<td>1.554</td>
<td>.055</td>
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<td>5</td>
<td>8.255</td>
<td>1.437</td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup>Groups: 1) teacher educators N=41; 2) junior high school teachers N=45.

<sup>b</sup>Critical F ratio value = 3.96.

* Significant at .05 level.
Developmental tasks

The part of Question II that concerned developmental tasks was analyzed in the same manner as the goals. The tasks were ranked by importance according to their means and then compared with the ranking for number of activity associations per developmental task by a Spearman rank order correlation coefficient. Table 11 shows the mean scores for the importance of developmental tasks as rated by the teacher educators and junior high school teachers (N=56).

One of the developmental tasks, "accepting one's self as a worthwhile person", was rated "extremely important" to junior high school industrial arts programs. Developmental tasks 5, 6, 7, 8, 9 and 10 were all rated "important" to industrial arts. The other three tasks were rated "undecided". The lowest ranking task, "behaving according to a shifting peer code", had a mean score of 5.811.

The task importance ranking was compared with the task-activity association ranking from Table 7 to determine if the tasks with the largest number of activities associated with them also had the highest rated importance. A Spearman rank order correlation coefficient was used for the comparison. Table 12 shows the two rankings and their related correlation coefficient.
Table 11. Mean scores for the rated\textsuperscript{a} importance of each developmental task and its corresponding rank

<table>
<thead>
<tr>
<th>Developmental tasks by number</th>
<th>Mean scores</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6.698</td>
<td>8</td>
</tr>
<tr>
<td>2</td>
<td>9.358</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>5.811</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td>6.642</td>
<td>9</td>
</tr>
<tr>
<td>5</td>
<td>7.226</td>
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</tr>
<tr>
<td>6</td>
<td>7.811</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>8.585</td>
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</tr>
<tr>
<td>8</td>
<td>7.736</td>
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</tr>
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<td>9</td>
<td>8.113</td>
<td>3</td>
</tr>
<tr>
<td>10</td>
<td>7.132</td>
<td>7</td>
</tr>
</tbody>
</table>

\textsuperscript{a}Rated on a ten point scale: (10-9) extremely important, (8-7) important, (6-5) undecided, (4-3) little importance, (2-1) no importance.

The correlation coefficient of .21 was not significant at the .05 level. Therefore, there was no relationship between the number of activities associated with each developmental task and the rated importance of that developmental task.
Table 12. A comparison of developmental task importance ranking and number of activities per task ranking

<table>
<thead>
<tr>
<th>Developmental task by number</th>
<th>Task importance ranking</th>
<th>Number of activities per task ranking</th>
<th>Correlation coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>3</td>
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</tr>
<tr>
<td>3</td>
<td>10</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>9</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>6</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>2</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>5</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>3</td>
<td>6</td>
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<tr>
<td>11a</td>
<td>11</td>
<td>2</td>
<td>$R_s = .21$</td>
</tr>
</tbody>
</table>

\(^a\)Not a task but a rating option "none of the developmental tasks".

Research Hypothesis II:

It was hypothesized that there was no difference between industrial arts teacher educators and junior high school industrial arts teachers on each of the ratings concerning the importance of developmental tasks.

The hypothesis presented combined the ratings of
developmental task importance for the teacher educators and compared them with the combined ratings of developmental task importance by the junior high school teachers. This was done for each of the ten developmental tasks. An analysis of variance was then computed to determine whether there was a significant difference in the two groups for each of the developmental tasks. A summary of the analysis of variance tables is seen in Table 13. A complete listing of the analysis of variance tables can be found in Appendix I.

There was a significant difference between the two groups on one of the ten developmental tasks. The third developmental task, "behaving according to a shifting peer code", had a larger overall mean for the teacher educators than for the junior high school teachers. The F ratio is larger than the critical F value at the .05 level. The teacher educators, therefore, rated developmental task number three significantly higher in importance than the junior high school teachers. Since all of the other developmental tasks were not significant, the null hypotheses for these tasks were not rejected.

The task importance ranking for teacher educators was compared with the importance ranking for junior high school teachers. It was found that the two rankings had a significant correlation of .91. Therefore, the two groups agreed
Table 13. A summary of the analysis of the variances relating to Hypothesis II

<table>
<thead>
<tr>
<th>Developmental tasks by number</th>
<th>Group&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Rank</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>F ratio&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
<td>9</td>
<td>6.900</td>
<td>1.997</td>
<td>0.304</td>
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<tr>
<td></td>
<td>4</td>
<td>8</td>
<td>6.576</td>
<td>2.120</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>1</td>
<td>9.300</td>
<td>0.923</td>
<td>0.155</td>
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<td>1</td>
<td>9.394</td>
<td>0.788</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>10</td>
<td>6.600</td>
<td>1.635</td>
<td>4.546*</td>
</tr>
<tr>
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<td>4</td>
<td>10</td>
<td>5.333</td>
<td>2.327</td>
<td></td>
</tr>
<tr>
<td>4</td>
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<td>8</td>
<td>7.300</td>
<td>1.780</td>
<td>3.285</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>9</td>
<td>6.242</td>
<td>2.208</td>
<td></td>
</tr>
<tr>
<td>5</td>
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<td>5.5</td>
<td>7.550</td>
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<td>1.051</td>
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<td>8.636</td>
<td>1.245</td>
<td></td>
</tr>
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<td>8</td>
<td>3</td>
<td>7</td>
<td>7.350</td>
<td>1.497</td>
<td>2.553</td>
</tr>
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<td>4</td>
<td>7.970</td>
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</tr>
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<td>1.833</td>
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<td>7</td>
<td>6.879</td>
<td>2.012</td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup>Groups: 3) teacher educators N=25; 4) junior high school teachers N=31.

<sup>b</sup>Critical F ratio value = 4.02.

* Significant at .05 level.
Question III

The last question of this study asked how well the industrial arts profession felt that the industrial arts curriculum attained its program goals and provided for the attainment of student developmental tasks. To answer this question, an overall mean for attainment was calculated for each of the program goals and developmental tasks. These means were then ranked and compared with a ranking of the number of activity associations for each program goal and developmental task. The ranking of attainment was also compared with the importance ranking for the goals and tasks. For the purposes of discussion, this question was analyzed in four sections: the first section for goals, the second for Hypothesis III which was related to goals, the third for developmental tasks, and the fourth for Hypothesis IV which was related to developmental tasks.

Industrial arts goals

To determine the attainment ranking of the goals, related data was organized as seen in Table 14. This table shows the mean score for the attainment of goals as rated by the teacher educators and junior high school teachers (N=86).

The highest rating of attainment had a mean of 7.221
Table 14. Mean scores for the rated\(^a\) attainment of each program goal and its corresponding rank

<table>
<thead>
<tr>
<th>Goals by number</th>
<th>Mean scores</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5.547</td>
<td>8</td>
</tr>
<tr>
<td>2</td>
<td>5.988</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>5.326</td>
<td>9</td>
</tr>
<tr>
<td>4</td>
<td>7.221</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>5.977</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>5.244</td>
<td>10</td>
</tr>
<tr>
<td>7</td>
<td>5.663</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>5.674</td>
<td>6.5</td>
</tr>
<tr>
<td>9</td>
<td>6.535</td>
<td>3</td>
</tr>
<tr>
<td>10</td>
<td>5.674</td>
<td>6.5</td>
</tr>
</tbody>
</table>

\(^a\)Rated on a ten point scale: (10-9) extremely well, (8-7) good, (6-5) moderate, (4-3) weak, (2-1) extremely poor.

which was a rating of "good" for goal number four, "to develop basic skills in the proper use of common industrial tools, machines and processes". All the other goals were perceived to be attained to a "moderate" degree in junior high school industrial arts programs.

To determine if the goals with the highest rated attainment in the public schools also had the largest number of
activities associated with them, their respective rankings were compared. This comparison was made by calculating a Spearman rank order correlation coefficient. Table 15 shows the two rankings and the resultant correlation coefficient.

The correlation coefficient of .17 was not significant at the .05 level. Therefore there was no relationship between the number of activities associated with each program goal and the rated attainment of that goal.

Table 15. A comparison of goal attainment ranking and number of activities per goal ranking

<table>
<thead>
<tr>
<th>Goals by number</th>
<th>Goal attainment ranking</th>
<th>Number of activities per goal ranking</th>
<th>Correlation coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8</td>
<td>6</td>
<td>R_s = .17</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>9</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>10</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>2</td>
<td>9.5</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>6.5</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>3</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>6.5</td>
<td>9.5</td>
<td></td>
</tr>
<tr>
<td>11^a</td>
<td>11</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

^aNot a goal but a rating option of "none of the goals".
Another comparison was made to determine if those goals with the highest ratings of importance were also the goals with the highest ratings of attainment. To make this comparison the attainment ranking of the goals was compared with the respective importance ranking. A Spearman rank order correlation coefficient was computed as shown in Table 16 along with the rankings.

Table 16. A comparison of goal attainment ranking and goal importance ranking

<table>
<thead>
<tr>
<th>Goals by number</th>
<th>Goal attainment rank</th>
<th>Goal importance rank</th>
<th>Correlation coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>9</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>1</td>
<td>$R_s = .21$</td>
</tr>
<tr>
<td>6</td>
<td>10</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>2</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>6.5</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>6.5</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>
The correlation coefficient of .21 was not significant at the .05 level. For an N of 10 the coefficient would need to be .58 for significance. Therefore there was no relationship between the perceived attainment of the goals and their rated importance.

Research Hypothesis III:

It was hypothesized that there was no difference between industrial arts teacher educators and junior high school industrial arts teachers on their ratings of how well the industrial arts curriculum was attaining its program goals.

The hypothesis presented combined ratings of goal attainment for the teacher educators and compared them with the combined rating of goal attainment for junior high school teachers. This was done for each of the ten goals. A summary of the analysis of variance tables that were used to test for significant differences is presented in Table 17. A complete listing of the analysis of variance tables can be found in Appendix J.

There was a significant difference between the two groups on seven of the ten goals. The other three goals were not significant at the .05 level. Therefore, for goals 1, 6, and 7 the null hypothesis was not rejected.

For all of the seven goals that were rated significantly different, the overall mean for teacher educators was lower
Table 17. A summary of the analysis of variances relating to Hypothesis III

<table>
<thead>
<tr>
<th>Goals by number</th>
<th>Group</th>
<th>Rank</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>F ratio (^a)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>5</td>
<td>5.333</td>
<td>1.611</td>
<td>1.273</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>9</td>
<td>5.723</td>
<td>1.584</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>4</td>
<td>5.564</td>
<td>1.586</td>
<td>4.688*</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>6</td>
<td>6.340</td>
<td>1.710</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>9.5</td>
<td>4.795</td>
<td>1.824</td>
<td>6.679*</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>8</td>
<td>5.766</td>
<td>1.658</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>1</td>
<td>6.846</td>
<td>1.679</td>
<td>4.072*</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>1</td>
<td>7.532</td>
<td>1.472</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>6</td>
<td>5.256</td>
<td>1.874</td>
<td>12.013*</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>4</td>
<td>6.575</td>
<td>1.652</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>9.5</td>
<td>4.795</td>
<td>2.041</td>
<td>3.718</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>10</td>
<td>5.617</td>
<td>1.906</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>1</td>
<td>2</td>
<td>6.256</td>
<td>1.910</td>
<td>3.816</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>3</td>
<td>7.000</td>
<td>1.615</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>8</td>
<td>4.846</td>
<td>2.059</td>
<td>12.695*</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>5</td>
<td>6.362</td>
<td>1.882</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>1</td>
<td>3</td>
<td>5.744</td>
<td>1.970</td>
<td>13.371*</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>2</td>
<td>7.192</td>
<td>1.702</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>1</td>
<td>7</td>
<td>5.154</td>
<td>2.020</td>
<td>5.214*</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>7</td>
<td>6.106</td>
<td>1.844</td>
<td></td>
</tr>
</tbody>
</table>

\(^a\)Groups: 1) teacher educators N=41; 2) junior high school teachers N=45.

\(^b\)Critical value for F ratio 3.96.

*Significant at .05 level.
than the mean for junior high school teachers. The following goals were those that were rated significantly different in attainment by the two groups:

2. Discovering and developing talents, aptitudes, interests, and potentialities of individuals for technical pursuits and the applied sciences;

3. To develop understanding of industrial processes and the practical application of scientific principles;

4. To develop basic skills in the proper use of common industrial tools, machines, and processes;

5. To develop problem solving and creative abilities involving the materials, processes, and products of industry;

8. To develop those traits which will help students obtain and maintain employment;

9. To develop an appreciation for good craftsmanship and design;

10. To develop consumer knowledges to a point where students can select, buy, use, and maintain the products of industry intelligently.

Teacher educators rated the attainment of goals 2, 3, 4, 5, 8, 9, and 10 significantly lower than the junior high school teachers.

A Spearman correlation coefficient was computed to compare attainment rankings of the teacher educators and junior high school teachers. It was found that the two rankings had a significant correlation of .77. Therefore, the two groups agree on the relative attainment of the goals but, as seen in the analysis of variance tests, disagreed on the
magnitude of that attainment.

Developmental tasks

The question of how well the industrial arts profession felt that the curriculum provides for the attainment of developmental tasks was analyzed in the same manner as the goals. Means for the attainment of the tasks were computed. These were then ranked and compared with the rankings of the number of tasks per activity and task importance. Table 18 show the mean scores for the attainment of developmental

Table 18. Mean scores for the rated\textsuperscript{a} attainment of each developmental task and its corresponding rank

<table>
<thead>
<tr>
<th>Developmental task by number</th>
<th>Mean scores</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5.906</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>7.132</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>5.962</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>6.566</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>5.453</td>
<td>9</td>
</tr>
<tr>
<td>6</td>
<td>6.283</td>
<td>3</td>
</tr>
<tr>
<td>7</td>
<td>5.698</td>
<td>8</td>
</tr>
<tr>
<td>8</td>
<td>5.925</td>
<td>5</td>
</tr>
<tr>
<td>9</td>
<td>5.887</td>
<td>7</td>
</tr>
<tr>
<td>10</td>
<td>5.340</td>
<td>10</td>
</tr>
</tbody>
</table>

\textsuperscript{a}Rated on a ten point scale: (10-9) extremely well, (8-7) good, (6-5) moderate, (4-3) weak, (2-1) extremely poor.
tasks as rated by the teacher educators and junior high school teachers (N=56).

The highest rating of attainment had a mean of 7.132 which was rating of "good" for task number two, "accepting one's self as a worthwhile person". All of the other developmental tasks were perceived as being attained to a "moderate" degree in junior high school industrial arts programs.

The attainment ranking and number of activity associations ranking for the tasks were compared to determine if the tasks with the largest number of activities associated with them also had the highest rated attainment. A Spearman rank order correlation coefficient was used to compare the rankings. Table 19 shows the two rankings for developmental tasks.

The correlation coefficient of .15 was not significant at the .05 level. Therefore, there was no relationship between the number of activities associated with each developmental task and the rated attainment of that task.

Another comparison was made to determine whether those developmental tasks with the highest ratings of importance were also the tasks with the highest ratings of attainment. To make this comparison the attainment ranking of the tasks was compared with the importance ranking by a Spearman rank
Table 19. A comparison of developmental task attainment ranking and number of activities per task ranking

<table>
<thead>
<tr>
<th>Developmental tasks by number</th>
<th>Task attainment ranking</th>
<th>Number of activities per task ranking</th>
<th>Correlation coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>9</td>
<td>9</td>
<td>$R_s = .15$</td>
</tr>
<tr>
<td>6</td>
<td>3</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>8</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>5</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>7</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>11a</td>
<td>11</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

order correlation coefficient. Table 20 shows the rankings and corresponding correlation coefficient.

The correlation coefficient of .03 was not significant at the .05 level. Therefore there was no relationship between the perceived attainment of the developmental tasks and their rated importance.
Table 20. A comparison of developmental task attainment ranking and task importance ranking

<table>
<thead>
<tr>
<th>Developmental tasks by number</th>
<th>Task attainment rank</th>
<th>Task importance rank</th>
<th>Correlation coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>9</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>8</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>5</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>7</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>7</td>
<td></td>
</tr>
</tbody>
</table>

Research Hypothesis IV:

It was hypothesized that there was no difference between industrial arts teacher educators and industrial arts teachers on ratings of how well the curriculum provided for the attainment of student developmental tasks.

The hypothesis presented combined ratings for each task attainment rating for the teacher educators and compared them with the combined rating of task attainment for junior high
school teachers. An analysis of variance was then computed to determine any significant differences between the two groups for each of the developmental tasks. A summary of the analysis of variance is presented in Table 21. A complete listing of the analysis of variance tables can be found in Appendix K.

None of the ten developmental tasks were significant at the .05 level. An F ratio of 4.02 or greater was needed to reject the null hypothesis. Therefore the teacher educators' ratings of the goals were not significantly different from those of the junior high school teachers for the provision of attainment of any of the developmental tasks.

A Spearman correlation coefficient was computed to compare attainment rankings for the teacher educators and junior high school teachers. It was found that the two rankings had a significant correlation of .83. Therefore, the two groups agreed upon the relative provision of attainment for developmental tasks by the curriculum.

Chapter Summary

From the analysis of the data gathered and presented in this chapter, there were several significant findings. It was determined that the sample of industrial arts learning activities covered all the program goals and developmental tasks. This coverage however was skewed toward some goals
Table 21. A summary of the analysis of variances relating to Hypothesis IV

<table>
<thead>
<tr>
<th>Developmental tasks by number</th>
<th>Group&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Rank</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>F ratio&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
<td>7.5</td>
<td>5.500</td>
<td>1.572</td>
<td>2.611</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>4.5</td>
<td>6.152</td>
<td>1.326</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>1</td>
<td>7.250</td>
<td>1.585</td>
<td>0.197</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>1</td>
<td>7.060</td>
<td>1.456</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>6</td>
<td>5.650</td>
<td>1.461</td>
<td>1.059</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>4.5</td>
<td>6.152</td>
<td>1.856</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>2</td>
<td>6.300</td>
<td>1.750</td>
<td>0.960</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>2</td>
<td>6.727</td>
<td>1.398</td>
<td></td>
</tr>
<tr>
<td>5</td>
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<td>10</td>
<td>5.050</td>
<td>1.276</td>
<td>1.822</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>9</td>
<td>5.697</td>
<td>1.896</td>
<td></td>
</tr>
<tr>
<td>6</td>
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<td>0.491</td>
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<td>6.424</td>
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<td>3</td>
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<td>5.400</td>
<td>1.698</td>
<td>0.865</td>
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<td>8</td>
<td>5.879</td>
<td>1.883</td>
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<td>3</td>
<td>4</td>
<td>5.850</td>
<td>1.872</td>
<td>0.053</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>6.5</td>
<td>5.970</td>
<td>1.811</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>3</td>
<td>5</td>
<td>5.750</td>
<td>1.943</td>
<td>0.191</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>6.5</td>
<td>5.970</td>
<td>1.667</td>
<td></td>
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<td>10</td>
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<td>5.550</td>
<td>2.115</td>
<td>0.482</td>
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<tr>
<td></td>
<td>4</td>
<td>10</td>
<td>5.212</td>
<td>1.431</td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup>Groups: 3) teacher educators N=31; 4) junior high school teachers N=25.

<sup>b</sup>Critical value for F value = 4.02.
and almost negligible for others. It was also found that there was no relationship between any of the ratings of number of activity associations, importance, or attainment for either the goals or developmental tasks.

All ten of the program goals were rated as being "important" to junior high school industrial arts. Developmental task number 2 was rated "extremely important" to junior high school industrial arts, while task numbers 5, 6, 7, 8, 9, and 10 were rated "important". A rating of "undecided" was given to task numbers 1, 3 and 4.

The teacher educators rated goals 1 and 6 significantly higher in importance than junior high school teachers. Goal numbers 4 and 8 were rated significantly lower in importance by teacher educators than by junior high school teachers. All other goals were not rated significantly different by the two groups. The groups did not agree on the relevance importance of the goals. The only developmental task that was rated significantly different by the two groups was task number 3 which was rated higher in importance by teacher educators.

The industrial arts profession rated the industrial arts curriculum attainment of goal number 4 "good", while all other goals were attained to a "moderate" degree. The industrial arts curriculum was rated to "moderately"
provide for the attainment of all the developmental tasks, except for task number 2 which was rated "good".

Teacher educators rated the attainment of goal numbers 2, 3, 4, 5, 8, 9, and 10 significantly lower than junior high school teachers. They were in agreement, though, on the relative attainment of the goals. There were no significant differences between the two groups on ratings of the provision of attainment by the industrial arts curriculum for developmental tasks.
CHAPTER V. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The first four chapters of this study described the background, methodology, and findings of the research undertaken. This chapter will summarize the study, present conclusions, and list recommendations.

Summary

Restatement of the problem

The problem of this study was twofold:

1. To determine whether typical industrial arts learning activities provide for the attainment of industrial arts curriculum goals and human developmental tasks appropriate to students.

2. To determine whether industrial arts teacher educators are in agreement with junior high school industrial arts teachers as to their perceptions of developmental tasks and program goals in industrial arts.

Restatement of the purpose

The purpose of this study was threefold:
1. To assist the industrial arts profession in determining whether industrial arts classes provide for the attainment for human developmental tasks;

2. To assist the industrial arts profession in determining whether industrial arts classes provide for the student acquisition of stated program goals;

3. To provide possible evidence as to the perceived status of industrial arts which would indicate problem areas for program improvement in industrial arts at the junior high school level.

A review of the literature provided a foundation upon which to base an investigation of the problem. The literature review was divided in three major parts, the first of which was industrial arts goals and objectives. A number of research studies that focused upon the 1953 and 1968 American Vocational Association listings of industrial arts goals were presented. These studies found that although industrial arts teachers from several states agreed upon the importance of industrial arts goals, they were not in agreement on goal importance with prominent national persons in the field. Other studies concluded that industrial arts had no clear set of original goals but in general accepted the AVA listings.
Research also indicated that industrial arts teachers' evaluation practices are not in agreement with the emphasis they felt should be given to industrial arts goals. Several different industrial arts goal listings were presented along with criteria established for the selection of goals relative to current industrial arts programs.

The second area of the review concerned the developmental tasks of the early adolescent. A number of theories and definitions of adolescence and early adolescence were reviewed. From these it was determined that early adolescence is a distinct phase of human development occurring between the ages of ten and sixteen and involving the sixth, seventh, and eighth grades in school. Listings of student needs were then reviewed and related to developmental tasks. Several research studies concerning developmental tasks were presented. Findings from these studies indicated that the early adolescent period of human development is crucial in relation to the accomplishment of developmental tasks. It was also recommended that all teachers should be able to appraise the developmental tasks confronting their students. Developmental task listings from various authors were presented along with criteria established for the selection of tasks for early adolescents.

The last area of the review concerned learning activities
and industrial arts. Guidelines were presented for developing learning activities which enable early adolescents to work on their developmental tasks while studying a given subject. Also noted were research findings relative to student learning experiences. These findings suggest that although independent study is desirable when it is self-activated, experiences involving the interaction of small groups of students should be fostered whenever possible. In addition, the learning experiences should be as diverse as the objectives ascribed to and should allow the student to practice behaviors suggested in the objective. Studies also indicated that the perceived worthwhileness of the learning experience makes a significant contribution to learning. A number of guidelines were presented for determining the "worthwhileness" of a learning activity and also for ensuring students the opportunity to acquire the process skills needed for future life. Finally, the present status of learning activities in industrial arts was reviewed. The largest content areas for learning activities in industrial arts were found to be woodworking, general shop, drafting, metals, and crafts. Industrial arts teachers were found to strongly favor individual project work.

The chapter concerning the procedure of the study analyzed the steps followed in order to complete the
research. An activity-assessment instrument was developed in order to obtain descriptions of typical junior high school industrial arts learning activities. This instrument was sent to a random sample of twenty-five junior high school teachers who were members of the American Industrial Arts Association. Fifty-nine learning activities were gathered from the teachers. A group of four experts reviewed the learning activities to determine whether they were representative of typical industrial arts programs. After further analysis, thirty-nine learning activities were selected for use in the study.

Two survey instruments, goal-activity and the developmental task-activity, were developed utilizing the listings of industrial arts goals and developmental tasks from the literature, plus the thirty-nine industrial arts student learning activities. The purpose of these surveys was to collect data relative to the importance, attainment and association with activities of the industrial arts goals and developmental tasks. Four random samples were selected to receive the surveys. Fifty industrial arts teacher educators received the goal-activity survey, and another fifty teacher educators received the developmental task-activity survey. The other two groups consisted of fifty junior high school industrial arts teachers who received the goal-activity
survey and fifty junior high school industrial arts teachers who received the developmental task-activity survey. Of the two hundred surveys sent, a total of one hundred twenty-eight, or 68%, were returned in usable form. The data were coded and analyzed by a computer program.

The findings of the study were based upon the stated questions and supporting hypotheses. All of the industrial arts goals and developmental tasks had learning activities associated with them. The goal, "to develop basic skills in the proper use of common industrial tools, machines, and processes" had the largest number—33.3%—of activity associations, while the task, "moving from the concrete to the abstract and applying general principles to the particular" had the largest number—18%—of activity associations. The rank order correlation coefficients indicated that there was no relationship between the number of activities associated with each goal and task and the rated importance of those goals and tasks.

The following list indicates the goals that were rated significantly different in importance by teacher educators and junior high school teachers:

1. To develop an insight and understanding of industry and its place in our culture:
2. To develop basic skills in the proper use of common industrial tools, machines, and processes;

3. To develop an understanding of industrial and technological career opportunities and their requirements;

4. To develop those traits which will help students obtain and maintain employment.

The only task to be rated significantly different in importance was "behaving according to a shifting peer code."

The industrial arts profession perceived the industrial arts curriculum to be "moderately" attaining all goals except for one, which was rated "good". The profession perceived the curriculum to be "moderately" providing for the attainment of tasks with the exception of one "good" rating. Correlation coefficients indicated that there was no relationship between the rated attainment of the goals or tasks and the rated importance of the goals or tasks. There also was no relationship between rated attainment and the number of activities associated with the goals and tasks.

The following is a list of the goals that were rated significantly different in attainment by the teacher educators and junior high school teachers:

1. Discovering and developing talents, aptitudes, interests, and potentialities of individuals for technical pursuits and applied sciences;

2. To develop an understanding of industrial processes and the practical application of scientific principles;
3. To develop basic skills in the proper use of common industrial tools, machines, and processes;

4. To develop problem-solving and creative abilities involving the materials, processes, and products of industry;

5. To develop those traits which will help students obtain and maintain employment;

6. To develop an appreciation for good craftsmanship and design;

7. To develop consumer knowledge to a point where students can select, buy, use, and maintain the products of industry intelligently.

There were no significant differences between industrial arts teacher educators and junior high school industrial arts teachers on each of the ratings concerning how well the curriculum is providing for the attainment of developmental tasks.

Conclusions

The conclusions of this study will be discussed in terms of the stated questions and hypotheses. The implications of the findings and their relationship to the problem will be summarized.

Question I

Do industrial arts student learning activities cover all identified program goals and developmental tasks?
Conclusion  It was concluded that the current learning activities students experience in industrial arts programs do provide for the attainment of a full range of stated industrial arts goals and early adolescent developmental tasks.

Discussion  The findings revealed that student learning activities did cover all the goals and tasks. It should be noted however that the activities were not uniformly associated with the goals and tasks. A large proportion of the learning activities focused upon developing skills in the use of common industrial tools, machines, and processes while ignoring developmental tasks. This conclusion is basically in agreement with the literature (Dyrenfurth 1976, Maley 1976) stating that typical industrial arts activities rarely focused upon developmental tasks and did not add up to all of the goals ascribed to the program. It is also basically in agreement with Baier (1973) and the rank order of 1968 AVA industrial arts goals found in his study.

Question II
Are the number of student learning activities proportionally distributed among the goals and tasks according to the rated importance of the program goals and developmental tasks?
Conclusion  It was concluded that the perceived importance of a program goal or developmental task has no effect on the number of learning activities which students experience in relation to that goal or task.

Discussion  Analyzing the rank order correlation coefficients between activity associations and importance it was found that no significant relationships existed. These findings are partially supported by Nelsen (1975) who concluded that industrial arts teachers' evaluation practices were not in agreement with the emphasis they felt should be given to industrial arts goals.

Hypothesis I:

It was hypothesized that there was no difference between industrial arts teacher educators and junior high school industrial arts teachers on their ratings concerning the importance of program goals.

Conclusion  It was concluded that any difference in goal importance ratings between industrial arts teacher educators and junior high school teachers was dependent upon the particular goal in question.

Discussion  As a result of the statistical tests, it was found that there were no significant differences between teacher educators and junior high school teachers on the rated
importance of six out of ten goals. Teacher educators rated the goals concerning understanding industry in our culture and career opportunities higher in importance while junior high school teachers rated the goals concerning basic skills and employment traits much higher in importance. In addition, it was found that teacher educators were not in agreement with junior high school teachers on the relative importance of the goals. This conclusion is partially supported by Burns (1975) who found no significant differences between Mississippi teacher educators and junior high school teachers.

**Hypothesis II:**

It was hypothesized that there was no difference between industrial arts teacher educators and junior high school industrial arts teachers on their ratings concerning the importance of developmental tasks.

**Conclusion**  It was concluded that there were no basic differences between the developmental task importance ratings of teacher educators and junior high school teachers with the exception of one developmental task.
Discussion  It was found that the only significant difference in importance ratings between the two groups was on the task concerning peer code behavior. Although the junior high school teachers rated this task lower in importance both groups rated this task as the least important. No literature was found that either supported or refuted this conclusion.

Question III

How well does the industrial arts profession feel that the industrial arts curriculum attains its program goals and provides for the attainment of student developmental tasks?

Conclusion  It was concluded that the industrial arts profession felt that the curriculum did attain its program goals and provide for the attainment of developmental tasks but that more could be done in terms of attainment.

Discussion  The mean attainment ratings revealed that the profession felt the goals and tasks were being attained "moderately," with the exception of the goal concerning basic skills and the task concerning the self being worthwhile which were both rated "good". However, it was also found that the perceived attainment of a goal or task had no relationship to the perceived importance or number of learning activities which students experienced in relation to that
goal or task. These findings are partially supported by Burns (1975) who found that no ratings of goal attainment were as high as the perceived importance of the goals.

**Hypothesis III:**

It was hypothesized that there was no difference between industrial arts teacher educators and junior high school industrial arts teachers on their ratings concerning how well the curriculum was attaining program goals.

**Conclusion**  It was concluded that any difference in ratings by industrial arts teacher educators and junior high school teachers concerning how well the curriculum was attaining program goals was dependent upon the particular goal in question.

**Discussion**  The findings revealed that there were significant differences in attainment ratings for the goals concerning individual talents, industrial processes, basic skills, problem-solving, employment traits, and craftsmanship. In all cases the teacher educators rated the attainment of these goals significantly lower than did the junior high school teachers. However, the teacher educators and junior high school teachers were in agreement on the relative attainment of the goals. No literature was found that either supported or refuted this conclusion.
Hypothesis IV:

It was hypothesized that there was no difference between industrial arts teacher educators and junior high school industrial arts teachers on their ratings concerning how well the curriculum was providing for the attainment of student developmental tasks.

Conclusion It was concluded that there was no difference between the two groups on ratings of how well the curriculum was providing for the attainment of student developmental tasks.

Discussion The findings revealed that the industrial arts profession agreed on their perception of the relative provision for attainment of developmental tasks and their degree of attainment.

Recommendations

The recommendations for this study are based upon the findings and conclusions that were presented. The recommendations which pertain to the field of industrial arts were numerically listed below:

1. As a result of this study it is recommended that the industrial arts profession re-establish the basic purposes of industrial arts on a national level. These purposes must reflect an analytical approach for the determination of the industrial arts program's reason for being in the public schools.
2. Teacher educators as a group, in their given universities, must determine the purposes and resulting goals of industrial arts education in relation to an expressed national purpose.

3. Industrial arts teacher educators must work more closely with the administration and industrial arts teachers in the public schools. This would help to reconcile differences between the purposes perceived by industrial arts teacher educators and those perceived by secondary industrial arts teachers.

4. Both teacher educators and junior high school teachers must become more familiar with developmental tasks for the early adolescent and their importance to the students' learning environment.

5. Junior high school industrial arts teachers must be more ingenious in devising learning activities that provide for the achievement of the objectives and goals of industrial arts. These activities need to represent all of the goals of industrial arts in order for students to gain the full benefit of the program.

6. Junior high school industrial arts teachers must devise activities that enable the students to work upon their developmental tasks while attaining the goals of the industrial arts program. This would help to meet the individual needs of students and prepare them for further stages of human development.

7. Finally, research such as this study on the status of industrial arts should be conducted periodically.
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Kluge, R. B. Developmental tasks: Middle adolescent peer culture tasks as observed in two selected environments, a high school and a community youth center (Doctoral dissertation, 1956). Dissertation Abstracts, 1956, 17, 565A.


Maley, D. The developmental tasks of youth--An important factor in program development for industrial arts. Man/Society/Technology, 1975, 35, 244-248.


Nelsen, W. The stated priority of selected goals for industrial arts compared with the priority of goals as determined by current evaluation practices (Doctoral dissertation, University of Northern Colorado, 1975). Dissertation Abstracts International, 1975, 36, 2687A.


ACKNOWLEDGMENTS

It is impossible to individually thank all of the people who helped me to complete this research. Therefore, I would like to take this space to offer thanks and extend my sincere appreciation to all those people who were in any way involved with this dissertation.

One person who definitely must be singled out and acknowledged for her assistance and typing is my wife Jan. Without her help, patience, dedication, and loving support this accomplishment would not have been possible. I only hope that I can offer as much assistance and support to her as she has so unselfishly given to me.

I owe a great deal of thanks to my major professor Bob Gelina. His guidance, motivation, and friendship undoubtedly have provided the most important and rewarding experiences of my graduate education.

I would like to thank William Wolansky for his interest and assistance in this research. Thanks also to Dick Warren for his help with the statistical analysis.

Finally, I would like to thank my doctoral committee for their guidance and assistance. Bob Gelina, Arthur Gowan, Ray Loyd, Dick Warren, and William Wolansky, thank you for helping me through my doctoral work.
APPENDIX A: LEARNING ACTIVITY-ASSESSMENT INSTRUMENT
Children learn through interactions with their environment. We as teachers can control this environment to provide students with the types of experiences that will help to promote the desired learning outcomes. The purpose of this survey is to collect examples of the experiences students have in industrial arts classes. These experiences, or learning activities, are those which are planned by the teacher and then by some method engaged in by the student. Learning activities can be as simple as the act of listening to a lecture or as complicated as constructing a house.

On the following pages please describe the five best learning activities which your students experience in your industrial arts classes. This should be done without regard to what the subject content of those courses is. IT IS VERY IMPORTANT THAT YOUR ACTIVITIES BE INCLUDED IN THIS STUDY IN ORDER FOR IT TO BE COMPLETE.

To help determine your learning activities ask yourself what you have your students take part in that best enables them to fulfill the purposes of your industrial arts program. When describing the activity list the things the student does such as listening, figuring, or constructing. Please be as brief but as complete as possible. The following is an example of how the survey should be completed.

SAMPLE
Purpose of the learning activity Students will learn to communicate ideas and information in the form of drawings.

Procedure followed by the student during the activity 1. Listen to the teacher present basic concepts of orthographic projection. 2. Sketch various shaped blocks using third angle projection.
LEARNING ACTIVITY # 1
Purpose of the learning activity

Procedure followed by the student during the activity

LEARNING ACTIVITY # 2
Purpose of the learning activity

Procedure followed by the student during the activity

LEARNING ACTIVITY # 3
Purpose of the learning activity

Procedure followed by the student during the activity
LEARNING ACTIVITY # 4
Purpose of the learning activity

Procedure followed by the student during the activity

LEARNING ACTIVITY # 5
Purpose of the learning activity

Procedure followed by the student during the activity

Please place your blue learning activity sheets in the envelope provided and return at the soonest possible date. Thank you once again for your assistance.
APPENDIX B: COVER LETTER FOR LEARNING ACTIVITY-
ASSESSMENT INSTRUMENT
January 16, 1978

Name
Street
City and State
Dear Name,

The enclosed survey is being sent to a random sample of junior high school industrial arts teachers throughout the United States who are members of the American Industrial Arts Association. Its use is to collect some of the better student learning activities in industrial arts that our students experience. By collecting these learning activities the industrial arts profession will be able to better analyze their efforts and needs in curriculum improvement.

The number on the survey form is to assure that each person will remain anonymous and to provide a means for a follow-up mailing should this become necessary. Your learning activities can be returned in the enclosed self-addressed stamped envelope.

The survey has been constructed so that a thorough understanding of the learning activity can be gained in the least amount of space. Please take a few moments to consider what you think are your best industrial arts learning activities, those which really enable your students to fulfill the purposes of industrial arts in (State). Directions can be found on the survey which will help you complete the instrument.

I would like to thank you in advance for your participation and assistance in this important research effort.

Sincerely,

Herbert F. Wedig
APPENDIX C: FOLLOW-UP LETTER FOR LEARNING ACTIVITY-ASSESSMENT INSTRUMENT
Name
Street
City and State

Dear Name,

I am writing concerning the learning activity assessment survey which you received during the third week of January. As of this date I have not received your reply.

I am in hopes of completing the collection of data prior to February 6 and would therefore like to ask that you check your stack of old mail for the survey. Enclosed with the survey was a self-addressed, stamped envelope which will return the materials to me. I would appreciate it if you would get the materials together and in the mail as soon as possible. Just in case you have misplaced the survey I have enclosed another copy.

If you have completed the materials in the last couple of days the letters may have crossed in the mail. I would again like to thank you for your time, cooperation, and effort on behalf of this study.

Sincerely,

Herbert F. Wedig
APPENDIX D: LISTING OF INDUSTRIAL ARTS EXPERTS
Listing of Industrial Arts Experts:

Dr. James M. Bensen  
Assistant Dean  
School of Industry and Technology  
University of Wisconsin-Stout  
Menomonie, Wisconsin 54751

Mr. Lee Carter  
State Supervisor, AIAA Past President  
State Board for Vocational Education  
Boise, Idaho 83720

Dr. Donald P. Lauda  
Dean, School of Technology  
Eastern Illinois University  
Charleston, Illinois 61920

Mr. James Snyder  
State Supervisor  
Department of Public Instruction  
Charleston, West Virginia 25300
APPENDIX E: GOAL-ACTIVITY AND DEVELOPMENTAL TASK-ACTIVITY SURVEYS

Goal-Activity Survey
Goal-Activity Survey
The following rating sheets are divided into three major sections. Section 1 is to determine how you feel about some commonly identified industrial arts goals from a review of the literature in our field. Section 2 is to determine how well you feel the industrial arts profession is currently attaining these goals in junior high schools. The last section is to determine which goals you feel students have the opportunity to attain through the enclosed industrial arts activities.

SECTION 1 - IMPORTANCE (time needed: approximately 5 minutes)

Please turn to page 1 of the blue sheets and read the ten industrial arts goals. They are not in any order of importance. Just below each goal is a scale from 1 to 10 on which you can indicate your feelings about the importance of this goal to junior high school industrial arts classes. Circle the number that best indicates your feeling.

SECTION 2 - ATTAINMENT (time needed: approximately 5 minutes)

Please turn to page 2 of the blue sheets and locate the section on attainment. Read the ten industrial arts goals once again. Just below each goal is a scale from 1 to 10 on which you can indicate how well current junior high school industrial arts programs attain these goals. Circle the number that best indicates your feeling.

SECTION 3 - ACTIVITIES (time needed: approximately 30 minutes)

Please turn to page 3 of the blue sheets and locate the section on activities. You will also need the enclosed industrial arts learning activities printed on the gold paper. There are a total of 39 learning activities. Please read each learning activity and then find its title on the blue rating sheet. To the left of each title is a circle. From the list of goals select the one most prominent goal which the student has an opportunity to attain by experiencing this learning activity. Write the number of the goal from the enclosed card in the circle.

After completing the blue rating sheets please detach these directions and mail the blue sheets back in the enclosed envelope.
GOALS

1. Develop an insight and understanding of industry and its place in our culture.

2. Discover and develop talents, aptitudes, interests, and potentialities of individuals for the technical pursuits and applied sciences.

3. Develop an understanding of industrial processes and the practical application of scientific principles.

4. Develop basic skills in the proper use of common industrial tools, machines, and processes.

5. Develop problem-solving and creative abilities involving the materials, processes, and products of industry.

6. Develop an understanding of industrial and technological career opportunities and their requirements.

7. Develop interest in industrial-technical areas which will lead to wise and enjoyable use of leisure time.

8. Develop those traits which will help students obtain and maintain employment.

9. Develop an appreciation for good craftsmanship and design.

10. Develop consumer knowledges to a point where students can select, buy, use, and maintain the products of industry intelligently.

11. None of the goals.

Use this card as a quick reference for the goals to be used in SECTION 3.
1. Develop an insight and understanding of Industry and its place in our culture.

2. Discover and develop talents, aptitudes, interests, and potentialities of individuals for the technical pursuits and applied sciences.

3. Develop an understanding of Industrial processes and the practical application of scientific principles.

4. Develop basic skills in the proper use of common industrial tools, machines, and processes.

5. Develop problem-solving and creative abilities involving the materials, processes, and products of industry.

6. Develop an understanding of Industrial and technological career opportunities and their requirements.

7. Develop interest in industrial-technical areas which will lead to wise and enjoyable use of leisure time.
8. Develop those traits which will help students obtain and maintain employment.

9. Develop an appreciation for good craftsmanship and design.

10. Develop consumer knowledge to a point where students can select, buy, use, and maintain the products of industry intelligently.

SECTION 2 - ATTAINMENT

1. Develop an insight and understanding of industry and its place in our culture.

2. Discover and develop talents, aptitudes, interests, and potentialities of individuals for the technical pursuits and applied sciences.

3. Develop an understanding of industrial processes and the practical application of scientific principles.

4. Develop basic skills in the proper use of common industrial tools, machines, and processes.
5. Develop problem-solving and creative abilities involving the materials, processes, and products of industry.

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6. Develop an understanding of industrial and technological career opportunities and their requirements.

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7. Develop interest in industrial-technical areas which will lead to wise and enjoyable use of leisure time.

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8. Develop those traits which will help students obtain and maintain employment.

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9. Develop an appreciation for good craftsmanship and design.

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10. Develop consumer knowledge to a point where students can select, buy, use, and maintain the products of industry intelligently.

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**SECTION 3 - ACTIVITIES**

1. Brushes
2. Woodworking
3. Tablesaw - Ripping
4. Tablesaw - Crosscutting
5. Hand Tools
6. Finishing
7. Wood Joints
8. Gluing
Developmental Task-Activity Survey
Developmental Task - Activity Survey
The following rating sheets are divided into three major sections. Section 1 is to determine how you feel about some commonly identified early adolescent developmental tasks. Section 2 is to determine how well you feel the industrial arts profession is currently providing for the attainment of these developmental tasks in junior high school industrial arts classes. The last section is to determine which tasks you feel students have the opportunity to attain through the enclosed industrial arts activities.

SECTION 1 - IMPORTANCE  (time needed: approximately 5 minutes)

Please turn to page 1 of the blue sheets and read the ten developmental tasks for the early adolescent. They are not in any order of importance. Just below each task is a scale from 1 to 10 on which you can indicate your feelings about the importance of this task to junior high school industrial arts classes. Circle the number that best indicates your feeling.

SECTION 2 - ATTAINMENT  (time needed: approximately 5 minutes)

Please turn to page 2 of the blue sheets and locate the section on attainment. Read the ten developmental tasks once again. Just below each task is a scale from 1 to 10 on which you can indicate how well current junior high school industrial arts programs provide for the attainment of these developmental tasks.

SECTION 3 - ACTIVITIES  (time needed: approximately 30 minutes)

Please turn to page 3 of the blue sheets and locate the section on activities. You will also need the enclosed industrial arts learning activities printed on the gold paper. There are a total of 39 learning activities. Please read each learning activity and then find its title on the blue rating sheet. To the left of each title is a circle. From the list of tasks select the one most prominent task which the student has an opportunity to attain by experiencing this learning activity. Write the number of the task from the enclosed card in the circle.

After completing the blue rating sheets please detach these directions and mail the blue sheets back in the enclosed envelope.
DEVELOPMENTAL TASKS

1. Establishing one's independence from adults in all areas of behaviors.

2. Accepting one's self as a worthwhile person.

3. Behaving according to a shifting peer code.

4. Strong identification with one's own sex mates.

5. Learning one's role in heterosexual relationships.

6. Controlling and using a new body.

7. Using language to express and to clarify more complex concepts.

8. Moving from the concrete to the abstract and applying general principles to the particular.

9. Building and testing a value system.

10. Organizing thoughts and feelings about one's self based on the reality of one's appearance.

11. None of the developmental tasks.

Use this card as a quick reference to the developmental tasks to be used in SECTION 3.
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<td>Accepting one's self as a worthwhile person.</td>
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<td>Behaving according to a shifting peer code.</td>
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<td>Learning one's role in heterosexual relationships.</td>
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<td>6</td>
<td>Controlling and using a new body.</td>
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<td>7</td>
<td>Using language to express and to clarify more complex concepts.</td>
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8. Moving from the concrete to the abstract and applying general principles to the particular.

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9. Building and testing a value system.

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10. Organizing thoughts and feelings about one's self based on the reality of one's appearance.

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**SECTION 2 - ATTAINMENT**

1. Establishing one's independence from adults in all areas of behaviors.

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<tr>
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2. Accepting one's self as a worthwhile person.

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3. Behaving according to a shifting peer code.

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4. Strong identification with one's own sex mates.

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</table>
5. Learning one's role in heterosexual relationships.

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Industrial Arts Learning Activities Utilized in the Goal-Activity and Developmental Task-Activity Surveys
INDUSTRIAL ARTS LEARNING ACTIVITIES

On the following pages are a collection of typical learning activities from junior high school industrial arts programs. These were gathered within the last four months from industrial arts teachers around the country who are members of the American Industrial Arts Association. Most of these activities have not been changed in any way so that they would not be biased by interpretation. The titles have been added so that it will be easier to find the proper activity on the blue rating sheet. These activities are to be used in conjunction with section 3 on the blue rating sheet.

Learning Activities

1. BRUSHES

   Purpose of the activity: Students will learn to clean a brush and appreciate a good clean brush.

   Procedure followed by the student:
   1. Students will listen, watch, and feel good brushes.
   2. Students will list finishes and respective solvents.
   3. Watch cleaning and stirring steps.
   4. Watch poor brush vs. good brush.

2. WOODWORKING

   Purpose of the activity: Learns to use hand woodworking tools. Learns what it is really like to build something for himself.

   Procedure followed by the student:
   1. Student plans his working project.
   2. He builds it using tools and processes needed.
3. TABLESAW - RIPPING

Purpose of the activity: The students will be able to rip a board on the tablesaw.

Procedure followed by the student:
1. Listen to the teacher present the basic methods used.
2. Watch the demonstration given by the teacher.
3. Make a sample cut themselves.

4. TABLESAW - CROSSCUTTING

Purpose of the activity: The students will learn to use the stop block method of cutting boards to length on the tablesaw.

Procedure followed by the student:
1. The student will watch the demonstration by the teacher.
2. Then set it up themselves and make a practice cut using the method shown.

5. HAND TOOLS

Purpose of the activity: The students will be able to square a board to a given dimension to learn the basic operation of hand tools.

Procedure followed by the student:
1. Layout and square a board, given the tools and the final dimensions to be achieved.

6. FINISHING

Purpose of the activity: Methods of finishing, types of finishing, and why finishing is important to overall appearance of the project.

Procedure followed by the student:
1. Listen to teacher give brief lesson reasons for finishing.
2. Select proper finish for the project and check with teacher for approval.
3. Apply finish correctly and clean up finishing area correctly so it will be available for the next student to use.
7. WOOD JOINTS

Purpose of the activity: To be able to identify and construct a butt, dado, mitre, end lap, and cross lap joint.

Procedure followed by the student:
1. Listen to and view lecture-demo on wood joints and their construction.
2. Students lay out, cut and assemble the above joints using two pieces of 3/4" x 1\(\frac{1}{2}\)" x 8" stock and hand tools.

8. GLUING

Purpose of the activity: To be able to prepare and glue materials edge to edge and follow directions accurately.

Procedure followed by the student:
1. Students read about glues and gluing as well as the machines used to prepare the materials.
2. Demonstrations are conducted for the radial saw, jointer and circular saw.
3. Students will then rough cut stock on the radial saw, joint the best edge and rip on the circular saw using a push stick.
4. Three strips of Mahogany and two of Maple are cut.
5. Second sawed edge is jointed and materials are set up in clamps and glued.

9. MEASUREMENT

Purpose of the activity: To become familiar with the measurement of wood and be able to measure the thickness, width, length and squareness of given boards.

Procedure followed by the student:
1. Listen to and view lecture-demo on measuring tools and their use.
2. Work in groups to use as many different measuring tools available (identifying each) to measure given samples of wood and record.
3. One student acts as checker for group.
10. LATHE

Purpose of the activity: To be able to apply the principle of cutting on the lathe and gain a basic understanding of face plate turning through the exploratory use of the appropriate cutting tools.

Procedure followed by the student:
1. The student reads about the lathe and answers questions for homework.
2. This is followed by a demonstration and discussion at the lathe where they see a 3\(\frac{1}{2}\)" diameter knob for the top of a bread box turned.
3. Students cut the block, do the appropriate lay out, and create a knob which must check 3\(\frac{1}{2}\)" diameter.
4. All other shape and design aspects are of their own creation through the exploratory use of the lathe tools.

11. THREE VIEW DRAWINGS

Purpose of the activity: The student will learn how to visualize objects in his mind and how to communicate with a three view drawing.

Procedure followed by the student:
1. Observes the instructor show how to draw three views.
2. Given three views of an object and a perspective view of the same object the student will identify surface areas and lines.
3. Student will sketch three views of various objects.
4. Student will then use equipment to draw three views.

12. PROJECT DRAWING

Purpose of the activity: Students make drawings which could be put to practical use.

Procedure followed by the student:
1. Students learn to draw by demonstration, lecture and doing three view drawings.
2. Students do drawings.
3. Students lay out metal and wood projects.
13. DRAWING SKILLS

Purpose of the activity: The student will have a knowledge of representation through drawings and will develop basic skills in drawing with mechanical instruments and sketching.

Procedure followed by the student:
1. Listen to the teacher present the use of an architect's scale, divider, compass, angles.
2. Do exercise with scale (1", ½", ⅛", 1/8", and 1/16").
3. Learn to divide spaces equally.
4. Learn to divide straight lines into any number actual parts.
5. Learn to block in a drawing using instruments.

14. FOLLOWING DRAWING DIRECTIONS

Purpose of the activity: To promote skill in following directions for hand-sketching, use of basic drafting tools, and drawing techniques.

Procedure followed by the student.
1. Students organized in teams of four (4) each with Team Chief.
2. Instructor presents overview of concepts, ideas and objectives.
4. Instructions progressively are reduced to increase student understanding of required problems (projections, perspectives, ortho, etc.).

15. LINE WIDTHS

Purpose of the activity: Student will be able to draw accurately the various line widths used in mechanical drawing.

Procedure followed by the student:
1. Prepared ditto sheet is passed to the students which has examples of the required line widths on it.
2. During his drawing activities he refers to this ditto sheet as a guide in drawing the different widths.
3. One drawing is devoted to reproducing the required line widths.
16. ORTHOGRAPHIC PROJECTION

Purpose of the activity: Student will understand the concept of orthographic projection and will be able to correctly place the various views in their proper relationship.

Procedure followed by the student:
1. Student first masters the concept of isometric sketching.
2. Listens to lecture-demo on orthographic projection.
3. On his isometric sketches the student labels and shades in the proper views.
4. Student then draws an orthographic projection sketch using the above information.

17. INCHES

Purpose of the activity: The student will be able to write the inch and list the increments down to and including sixteenths, without error.

Procedure followed by the student:
1. Student listens to presentation on the inch, copying the material down.
2. Student then takes a test over the inch.
3. If student makes an error he/she copies the inch until he can write it three times without error.
4. Student takes a retest.

18. MASS PRODUCTION

Purpose of the activity: Students become aware of the present methods of mass production as a basis for the actual production of a mass produced product in the shop.

Procedure followed by the student:
1. Instructor provides an overview of major topics to be studies.
2. Students in teams of four study assigned topics, using filmstrips, cassettes, texts. On completion of each assignment, they confer with instructor, then complete mini-test.
3. When all teams complete mini-test, teh class is organized as a manufacturing corporation.
4. Students select the management and workers for the production of a mass-produced product.
19. METAL INDUSTRIES AND PROCESSES

Purpose of the activity: Student will have a knowledge of the metal industries and processes. Student will gain skills in the safe practice and use of metal working tools.

Procedure followed by the student:
1. Student and teacher will discuss jobs in metal industries.
2. Student will learn industrial processes in metal industries (foundry, welding, brazing, soldering, cutting, melting, etc.).
3. Student will learn the names and uses of metal-working tools and machines (and their safe use).
4. Student will transfer design on sheet metal (tracing and scribing).
5. Student cuts out the design.

20. SOLDER

Purpose of the activity: Student will learn the strength of solder and its uses.

Procedure followed by the student:
1. Observe instructor, takes notes, and asks related questions.
2. The student will then receive necessary equipment to solder two pieces of 26 gauge sheet metal and then solders them properly.
3. The student observes the instructor testing joint for strength and receives comments from the instructor.

21. METAL CUTTING

Purpose of the activity: To teach proper methods of cutting different types of materials made of metal.

Procedure followed by the student:
1. Listen to teacher show and explain different types of cutting tools used in metalworking.
2. Identify tools through a short quiz.
3. Successfully use the correct tool for the cutting operation in normal shop work.
22. METAL FABRICATION

Purpose of the activity: Students learn about the fabrication of metal.

Procedure followed by the student:
1. Students read the text and answer questions.
2. Teacher lectures and demonstrates the various methods.
3. Students use the various methods to put project together.

23. SHEET METAL TOOLS

Purpose of the activity: Students learn to safely and correctly use basic sheet metal hand tools.

Procedure followed by the student:
1. Listen and watch instructor demonstrate the correct safe use.
2. Students will demonstrate what they have learned by using the tools.

24. OHM'S LAW

Purpose of the activity: Students will learn to use Ohm's Law correctly.

Procedure followed by the student:
1. Listen to blackboard explanation of Ohm's Law.
2. Students will solve and correct sample problems.
3. Students watch demonstration of application.
4. Students will perform various application on their own.

25. CURRENT AND CIRCUITS

Purpose of the activity: Students will learn the different types of current electricity and the basic types of circuits.

Procedure followed by the student:
1. Listen to teacher discuss D.C. current, A.C. current, parallel circuit and series circuit.
2. Student works in a group to construct a door bell (using 9 volt dry cell battery) and to observe D.C. current in the operation.
26. **PLASTICS**

Purpose of the activity: Students should learn about forming plastic.

Procedure followed by the student:
1. Students read and answer questions on plastics.
2. Demonstration of machines by teacher.
3. Students design and manufacture various vacuum formed signs.

27. **RUBBER STAMP**

Purpose of the activity: Students will learn to make and use a rubber stamp.

Procedure followed by the student:
1. Listen and watch a demonstration.
2. Students will list and review steps.
3. Students will make and print with a rubber stamp.

28. **CALCULATING COSTS**

Purpose of the activity: Students will learn to compute the material cost for their projects.

Procedure followed by the student:
1. Students will hear a lesson on computing linear feet, square feet and board feet and computing cost.
2. Students will apply this knowledge by computing the amount of the materials in their project and then figuring the costs.

29. **ENGINES**

Purpose of the activity: Students will learn the various kinds of engines.

Procedure followed by the student:
1. Listen to chart talk by instructor.
2. Students will study models.

30. **FOUR STROKE ENGINES**

Purpose of the activity: Student will be able to correctly list the four strokes of the four stroke engine, listing the proper direction of the pistons and five events.

Procedure followed by the student:
1. Student listens to lecture and demonstration with cut-away model.
2. Student takes a test.
3. If failed, complete worksheet and retakes the test.
31. PROJECT PREPARATION

Purpose of the activity: Project preparation in order to better have students understand the importance of proper planning to insure good working habits.

Procedure followed by the student:
1. Select project and have it approved by the teacher.
2. Prepare a drawing or copy of a drawing for approval include all information on drawing in order for construction to be complete.
3. Copy or make up own plan of work for the construction of the object.
4. Complete the bill of materials list and get price of item to be made and pay for materials before starting the item.

32. LEATHER DESIGN

Purpose of the activity: To be able to apply the principles of good design to the layout of a leather belt pattern and use this pattern to create a belt of the planned design.

Procedure followed by the student:
1. Students listen and participate in discussion regarding design layout.
2. They also look at samples of stamped and tooled work.
3. They look through catalogs and books for ideas realizing that they cannot copy or use a design idea of another student.
4. Procedure guidelines are followed as suggested by the teacher and designs are approved prior to the leather being issued.

33. DESIGN

Purpose of the activity: Students will design their own individual projects.

Procedure followed by the student:
1. As an integral part of each shop demonstration students will listen to many variations of each basic project.
2. They will be encouraged to create their own project.
34. PROJECT PLANNING

Purpose of the activity: Student will learn to develop an orderly procedure in planning a project and will learn to determine the amount of time for building a suitable project.

Procedure followed by the student:
1. Observes filmstrip in planning.
2. Observes instructor demonstration on usage of all hand wood working tools.
3. Student will draw plans, write steps of procedure and decide which tools to use.

35. ACCURACY

Purpose of the activity: Student will learn the importance of working accurately and develop a sense of pride in his work.

Procedure followed by the student:
1. During the student's woodworking activity he is assigned a tolerance according to his ability.
2. He may not move on to the next step until this tolerance has been attained.

36. SAFETY

Purpose of the activity: Promote safety in shop work.

Procedure followed by the student:
1. Listen to teacher explain the reasons for safety.
2. Have students fitted for safety glasses and teacher will explain the proper care of these glasses while in the hands of the students.
3. Review the importance of the glasses to be worn at all times and show examples of what could happen if not worn through the use of pictures, movies (if available), and simulated demonstration.

37. VOCATIONAL CHOICE

Purpose of the activity: To develop and lay plans for a vocational choice.

Procedure followed by the student:
1. Intervies a person or persons in that particular vocational choice.
2. Reports to the class either verbally or in written form.
38. SAFETY CONSCIOUSNESS

Purpose of the activity: Objective to teach safety consciousness, attitude and awareness of need for safety in shop, home and all environments.

Procedure followed by the student:
1. Instructor presents overview of objectives, concepts, demonstrations, illustrations and slides of various topics (general, specific, hand/power tools, ladders, electrical, fire, housekeeping).
2. Students, from assignment, study assigned topics, complete inspections and complete mini-tests of each topic.

39. SHOP MAINTENANCE

Purpose of the activity: Students will learn to help maintain and take pride in caring for the shop.

Procedure followed by the student:
1. Students will be given instruction on shop maintenance.
2. Students will clean and lubricate machines.
3. Students will sharpen chisels and plane irons.
4. Students build cabinets for storage.
5. Students make replacement parts for broken items.
APPENDIX F: COVER LETTERS FOR THE GOAL-ACTIVITY AND DEVELOPMENTAL TASK-ACTIVITY SURVEYS
Dear Name,

The enclosed survey is being sent to a random sample of industrial arts teacher educators throughout the United States. Its use is to determine what the industrial arts profession thinks about some commonly reported goals for industrial arts education and how these goals relate to the activities students participate in during junior high school classes. By analyzing your answers to these questions industrial arts at the present time can be assessed and possible directions the profession feels are important can be investigated.

The survey should probably take about 30 to 40 minutes of your time. The number on the survey form is to assure that each person will remain anonymous and to provide a means for a follow-up mailing should this become necessary. Your comments can be made on the enclosed blue rating sheets and returned in the self-addressed stamped envelope that is provided. Feel free to keep the industrial arts learning activities on the gold sheets. They have been estimated to represent the types of activities found in about 86% of the programs across the country at the present time.

I realize how busy things can be at this time of year. Therefore I would be very appreciative if you would complete these rating sheets into which a considerable amount of time, effort, and money have been invested. It is very important that your input be included in this study in order for it to be complete.

I would like to thank you in advance for your participation and assistance in this research effort.

Sincerely yours,

Herbert F. Wedig
Dear Name,

The enclosed survey is being sent to a random sample of junior high school industrial arts teachers throughout the United States who are members of the American Industrial Arts Association. Its use is to determine what the industrial arts profession thinks about some commonly reported developmental tasks for junior high school students and how these tasks relate to the activities students participate in during our classes. By analyzing your answers to these questions industrial arts at the present time can be assessed and possible directions the profession feels are important can be investigated.

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Being a junior high school industrial arts teacher myself I know how busy things can be at this time of year. Therefore I would be very appreciative if you would complete these rating sheets into which a considerable amount of time, effort, and money have been invested. It is very important that your input be included in this study in order for it to be complete.

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Sincerely yours,

Herbert F. Wedig
APPENDIX G: FOLLOW-UP LETTERS FOR THE GOAL-ACTIVITY AND DEVELOPMENTAL TASK-ACTIVITY SURVEYS
May 16, 1978

Name
Street
City, State and Zip

Dear Name,

I am writing concerning the Developmental Task-Activity Survey which you received during the first week of May. As of this date I have not received your reply.

I am in hopes of completing the collection of data prior to the end of May and would therefore like to ask that you check your stack of old mail for the survey. Enclosed with the survey was a self-addressed, stamped envelope which will return the materials to me. I would appreciate it if you would get the materials together and in the mail as soon as possible.

If you have completed the materials in the last couple of days the letters may have crossed in the mail. I would again like to thank you for your time, cooperation, and effort on behalf of this study.

Sincerely yours,

Herbert F. Wedig
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Sincerely yours,

Herbert F. Wedig
APPENDIX H: ANALYSIS OF VARIANCE TABLES RELATED TO HYPOTHESIS I
Table H1. Analysis of variance tables related to goal importance

<table>
<thead>
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APPENDIX I: ANALYSIS OF VARIANCE TABLES RELATED TO HYPOTHESIS II
Table II. Analysis of variance tables related to developmental task importance

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| Between | 1  | 1.460          | 1.460        | 0.678 |
| Within  | 51 | 109.860        | 2.154        |     |

| Task 9: |
|--------|----|----------------|--------------|----|
| Between | 1  | 5.610          | 5.610        | 1.518 |
| Within  | 51 | 188.465        | 3.695        |     |

| Task 10: |
APPENDIX J: ANALYSIS OF VARIANCE TABLES RELATED TO HYPOTHESIS III
Table J.l. Analysis of variance tables related to goal attainment

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APPENDIX K: ANALYSIS OF VARIANCE TABLES RELATED TO HYPOTHESIS IV
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| Within  | 51 | 160.719        | 3.151        |     |

| Task 10: |
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| Within  | 51 | 150.465        | 2.950        |     |