

THE PLACE OF INDUSTRIAL ARTS IN THE SMALL MONTANA
HIGH SCHOOL CURRICULUM

BY

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CHAPTER I

INTRODUCTION

Man is by nature creative and resourceful. From the Stone Age with its crude implements until today in what may be called the "Space Age" with its complex scientific devices, man has relied on his ability to develop contrivances to meet his needs and improve his standard of living.

Education in its broadest sense is intended to impart the heritages that have accrued through the ages and to prepare youth for useful membership in society. One of the primary goals of industrial arts education is to aid in successfully imparting and interpreting our present industrialized civilization to youth. Regarding recent changes in the relation of society, Hernandez stated:

During the past two or three decades, technological developments in industry have compelled all interested individuals to examine the public schools from the elementary level through the post-high school area. There have been innumerable studies carried out with respect to the relationship of education to an industrial and technological society. Such studies and observations have made us aware of the necessity of adjusting our educational system to the scientific age in which we are living.¹

In this fundamentally industrial society of today, as well as in the past, the adult members of society have been charged with the responsibility of keeping the entire educational program up-to-date. The writer's belief in the responsibility of adults to keep the educational program current, especially in the area of industrial arts,

¹Hernandez, L. Garcia, "Education in a Scientific Age," Industrial Arts and Vocational Education 47: 274-275, November, 1958.

caused this study of industrial arts education in Montana to be undertaken.

The Problem

The basic problem with which the writer was concerned was the place of industrial arts education in Montana high schools. More specifically, the problem was, "What is the place of industrial arts in the small Montana high school curriculum?"

Procedures

To secure information which would make possible a logical solution to the problem, two procedures were used. First, a review of literature was made to obtain a general understanding of industrial arts education on a national scale. Second, a questionnaire was developed and utilized as a means of getting opinions of Montana school administrators regarding industrial arts in the small Montana high school curriculum.

Limitations

The scope of the survey was limited in two ways: (1) only high schools in Montana with an enrollment of 400 students or less and without industrial arts programs currently in operation were considered and (2) questionnaires were sent to school administrators only. The first

limitation was necessary because of a current study by Olson¹ of small Montana high schools with industrial arts programs and by Skinner's² study, in 1959, of larger Montana high schools. The other limitation, that of obtaining opinions from school administrators only, was necessitated by considerations of time and money.

The significant findings from literature concerning the status of industrial arts nationally are given in Chapter II.

¹Olson, James, The Nature of the Industrial Arts Programs in the Small Montana High Schools, unpublished professional paper for the Master of Education degree, Montana State College, Bozeman, August, 1960.

²Skinner, Halver M., An Evaluation of the Industrial Arts Program of Montana Secondary Schools, unpublished thesis for the Master of Science degree in Industrial Education, Utah State University, Logan, 1959, 105 pp.

CHAPTER II

REVIEW OF LITERATURE

The review of literature was a means used in attempting to determine the place of industrial arts in the small high school curriculum. Available literature revealed many different views, ideas, and definitions of industrial arts education. Therefore, before the place of industrial arts could be determined, it was necessary to arrive at an acceptable understanding of industrial arts through a review of its historical background.

Historical Background of Industrial Arts Education

Industrial arts has been considered one of the newer subject areas of the high school curriculum. However, the principles embodied in industrial arts education date back several centuries and reflect the ideas and views of many persons.

As far back as the seventeenth century, Johann Amos Comenius (1592-1670) prepared one of the first "visualized" textbooks in existence, *Orbis Sensualium Pictus*, to improve instruction.¹ Comenius believed that "children should learn the most important principles of the mechanic arts, both that they might not be too ignorant of what goes on in the world around them, and that any special inclination toward things of this kind may assert itself with greater ease later on."²

¹Dale, Edgar, Audio-Visual Methods in Teaching, Revised Edition, Henry Holt and Company, Inc., New York, 1954, p. 59.

²Micheels, William J., editor, Industrial Arts in Utah, Part One, Tentative Edition, State Department of Education, Salt Lake City, 1941, p. 6.

A century later, Jean-Jacques Rousseau (1712-1778) criticized the teaching of his day and declared, "Take the reverse of current practice and you will almost do right."¹ Rousseau also stated that, "If instead of making a child stick to his books I employ him in a workshop, his hands labor to the profit of his mind, he becomes a philosopher but fancies he is only a workman."²

In still a later era, Johann Heinrich Pestalozzi (1756-1827), while attempting to improve the lot of the peasants in Switzerland, became interested in basing instruction on the "object method."³

One of his contemporaries, Johann Friedrich Herbart (1776-1841) declared, "Every growing boy and youth should learn to handle the recognized tools of the carpenter, as well as the ruler and compass. . . . And every man should learn to use his hands. The hand holds the place of honor at the sides of the power of speech in raising man above the beasts."⁴

After the middle of the nineteenth century, Della Vos introduced industrial education into Russia through use of a formal type of workshop.⁵ At almost the same time, the Sloyd system of manual training was developed in Sweden.⁶

¹Dale, op. cit., p. 60.

²Micheels, op. cit., p. 7.

³Dale, op. cit., p. 60.

⁴Micheels, op. cit., p. 8.

⁵Ibid., p. 8.

⁶Ibid., p. 8.

A few years later, in 1899, John Dewey wrote that, "We must conceive of work in wood and metal, of weaving, sewing, and cooking, as methods of life; not as distinct studies. . . . but as instruments through which the school itself shall be made a genuine form of active community life."¹

As early as 1908, Bonser foresaw industrial arts as a medium for enriching the offerings and extending the values of the regular school program.² He later defined industrial arts as "a study of the changes made by man in the forms of materials to increase their values, and of the problems of life related to these changes."³

Fales, in 1940, described industrial arts as, "the broad study of the materials, organization, tools, processes, products, jobs, and human problems of industry."⁴

Within the same decade, Wilber⁵ associated industrial arts with general education by describing industrial arts as "those phases of general education which deal with industry--its organization, materials, occupations, processes, and products--and with the problems resulting from the industrial and technological nature of society."

Perhaps because of the myriad of definitions and resulting

¹Ibid., p. 9.

²Ibid., p. 9.

³Wilber, Gordon O., Industrial Arts in General Education, International Textbook Company, Scranton, Pa., 1948, p. 2.

⁴Ibid., p. 2.

⁵Ibid., p. 2.

misunderstanding in the minds of lay people regarding industrial arts. The American Vocational Association, in 1954, comprehensively defined industrial arts as:

Instructional shopwork of a non-vocational type which provides general educational experiences centered around the industrial and technical aspects of life today and offers orientation in the areas of appreciation, production, materials and goods.¹

In general, the review of literature revealed that the rise of science and technology has done much to change American culture and that, as Smith² summarized, "American culture is in a period of profound reconstruction because science and technology have revamped the means by which men exploit their environment." The consequences of these new means of exploiting environment have been felt in education, particularly because of the close relationships of science and technology to industrial arts and of industrial arts to general education.

Relation of Industrial Arts to General Education

Industrial arts programs have for many years placed emphasis upon tool operations and manipulative experiences. Recently, according

¹American Vocational Association, Definitions of Terms in Vocational and Practical Arts Education, Committee on Research and Publications, The Association, D. C., 1954, p. 15.

²Smith, B. Othanel; Stanley, William O.; and Shores, J. Harlan, Fundamentals of Curriculum Development, World Book Company, New York, 1950, p. 24.

to Ericson,¹ a broadened concept of the place and function of industrial arts has emphasized that it is an integral part of general education. Good² has defined general education as, "a broad type of education aimed at developing attitudes, abilities, and behavior considered desirable by society but not necessarily preparing the learner for specific types of vocational or avocational pursuits."

It is apparent that Roberts³ also believed in industrial arts as a part of general education when he made the statement, "The practical arts in education are not designed to prepare a worker for a vocation but to provide him with general knowledge, skills and attitudes essential in his development as a citizen and homemaker." Even prior to Roberts' statement, Woods, in his address, "Technical Education," delivered before the State Teacher's Association at Shippensburg, Pennsylvania, August 12, 1874, referred to aspects of industrial arts education in his plea for general education:

Our duty as educators is not simply to instruct in one or a few studies, but to decide on the comparative value of different studies to different students, with different capacities, tastes, and purposes. The object to be moulded, and the use to be made of it, should be understood. What may be most useful to one at one time, may not be so at another time, or to another at the same time. The first thing to be studied, in the fit quantity, at the fit time, is to be decided --what will be best suited to furnish, stimulate, and strengthen the mind for the future work. The question is not whether a certain study is useful or not, but whether it is the most

¹Ericson, Emanuel E., Teaching the Industrial Arts, Chas. A. Bennett Company, Inc., Peoria, Ill., 1956, p. 177.

²Good, Carter V., Dictionary of Education, McGraw-Hill Book Company, Inc., New York, 1945, p. 183.

³Roberts, Roy W., Vocational and Practical Arts Education, Harper and Brothers, New York, 1957, p. 63.

useful for a certain student at a certain time, in his circumstances, and with his intended business or profession, and this, too, without reference to the taste, profit, or convenience of the teacher.

The relative worth of different kinds of knowledge to the student has not been sufficiently regarded. The studies he has pursued may be valuable, and to the extent to which he has pursued them, whilst they may be less so than other studies that might have been substituted in whole or in part. An immense amount of information bearing on the industrial activities, which should be understood by all, has been passed over, while the less useful has been studied. There has been a tendency to regard the useful as ignoble.

That there should be some change in our course of education, conforming to the increased extent of the sciences and their numerous applications, must be evident.

As soon as it can be done, shops should be erected, where certain trades or parts of trades can be learned, where the hand and eye can be trained, and the student prepared for work or the management of works. Those who take a higher course in our schools and universities, should receive thorough instruction in all the sciences which relate to engineering, agriculture, the arts, trades and manufactures.

Our best authorities agree that our public school system, so well adapted to a former state of society, fails to meet the wants of our people in the present state of civilization.

For the proper education of all our youth, with the least loss--the education that will best fit them for the duties of life, I plead. . . . I plead for useful learning in the school-room or the shop, or both, as a means of interesting our youth, giving them a taste for manual pursuits, so restraining them from idleness and crime; of enabling them to provide better for their own comfort and happiness, so increasing their self-respect and adding to the wealth and moral power of the State.¹

Even though industrial arts had its foundation established

¹Clarke, Isaac E., Art and Industry, Education in the Industrial and Fine Arts in the United States, Part III, U. S. Department of the Interior, Bureau of Education, Government Printing Office, Washington, D. C., 1897, pp. 736-741.

centuries ago, it was not possible to associate it with general education until near the end of the nineteenth century. About that time, the movement toward universal education on the secondary level became generally accepted. Since then, general education has become more important¹ because the aims and purposes, social and economic backgrounds, and the problems and needs of boys and girls in high schools today are quite different from those of youth enrolled before the turn of the nineteenth century. Byram pointed out that in the late 1800's preparation of youth for college was the chief purpose of the high school. His exact statement is:

In 1870 three fourths of those who attended high school went on to college. The high school's function was therefore clear; it was quite simply to prepare for college. Its curriculum, membership and general atmosphere were all dominated by that purpose. Those who went to high school were therefore a fairly homogeneous group, on the whole children of well-to-do families looking forward to the learned professions or to leadership in politics or trade.²

Davis, in looking at general education from a psychological viewpoint, declared that, "More attention should be paid to the importance of the activity instinct. Work is more than an activity; it is an emotional liberation. Thwarting this fundamental instinct may give rise to depression, followed by apathy and sometimes by psychoneuroses or to restlessness and irritability followed by rebellion."³

¹Byram, Harold M., and Wenrich, Ralph C., Vocational Education and Practical Arts in the Community School, the Macmillan Company, New York, 1956, p. 160.

²Ibid., p. 160.

³Ibid., p. 244.

Lerner also believed that a new job of education was to aid improvement of mental health by teaching students to understand themselves as shown in his statement:

The old school task of making the pupils literate has been replaced by the new task of enabling them to cope with the problems of emotional health. The principal difficulty is no longer with the three R's and with laying a base for an effective technical culture; it is with the student's understanding of his own drives, and with his discovery of his identity, and with guiding him through the curve of his emotional growth.¹

Since literature reveals that industrial arts is more often than not considered a part of general education, it is necessary to understand that general education is that type of education designed to facilitate the general development of all individuals in relation to their personal, civic, and social responsibilities. In 1942 Johnson and others stated that general education is general in at least three respects:

First, general education is intended for everyone-- not merely for the select few who become scholars or who enter the professions. No longer will preparation for college entrance dominate the curriculum of the high school which is committed to the objectives of general education. The program of such a school will be planned to meet the varied needs of all of the young people of the community which it serves.

Second, general education is concerned with the total personality--not merely with the intellect but with emotions, habits, attitudes. General education regards the student as a single unified being rather than a compartment of knowledge, one of feelings, another of beliefs. This means that specific

¹Lerner, Max, America as a Civilization, Simon and Shuster, Inc., New York, 1957, p. 739ff.

general education programs must be defined in terms of what the learner is or does rather than in terms of course content or a body of knowledge.

Third, general education is concerned with the individual's non-specialized activities. It consists of preparation for efficient living, no matter what one's vocation. This does not at all imply a lack of concern for vocational training. Since two of the responsibilities of every person are a contribution to society and the earning of his own living, general education should include the choosing of a vocation in relation both to one's own aptitudes and interests and to the needs of society.¹

Current literature indicated that the practical arts, including industrial arts, meet the three preceding criteria for general education. Byram specifically pointed this out in the three statements:

1. They (practical arts) are intended for everyone--those going to college as well as those who are not, boys as well as girls.
2. They are concerned with the total personality--physical development, mental and emotional stability, habits and attitudes toward work and workers as well as skill in the use of tools and materials and technical understanding.
3. They are concerned with the individual's non-specialized activities--the pupil preparing for a profession needs experiences in the practical arts as well as someone preparing for a career in agriculture, business, industry, or the home.²

The Industrial Arts Policy and Planning Committee of the American Vocational Association has prepared the following comprehensive statement of industrial arts and its relation to general education:

¹Byram and Wenrich, op. cit., p. 83.

²Ibid., p. 83.

Industrial arts, as a part of general education, does not have a set of objectives which industrial arts alone supports but it does make unique contributions to objectives which are common to the entire school program. Industrial arts is basically a shop or laboratory subject area; it emphasizes the use of tangible media and the problem solved usually results in concrete things; it provides for extensive expressional opportunities; it provides experiences in which the learning takes place through the sense of feeling or touch in conjunction with the avenues of seeing and hearing; it is conducive to informal class organization patterns; it derives its content from the world of work.¹

In the Minnesota Plan,² three cores of instruction for industrial arts: technology, design, and science-mathematics were proposed. The American Vocational Association in 1953, formulated the following statement of nine general objectives of industrial arts as related to the all-school aims of education:

1. Interest in industry. To develop in each pupil an active interest in industrial life and in the methods and problems of production and exchange.
2. Appreciation and use. To develop in each pupil the appreciation of good design, materials, and workmanship, and the ability to select, care for, and use industrial products wisely.
3. Self-realization and initiative. To develop in each pupil the habits of self-reliance and resourcefulness in meeting practical situations.
4. Cooperative attitudes. To develop in each pupil a readiness to assist others and to join in socially accepted group undertakings.

¹American Vocational Association, A Guide to Improving Instruction in Industrial Arts, Industrial Arts Policy and Planning Committee, The Association, Washington, D. C., 1953, p. 13.

²Micheels, William J., and Sommers, Wessley S., The Minnesota Plan for Industrial Arts Teacher Education, McKnight and McKnight Publishing Company, Bloomington, Ill., 1958, 48 pp.

5. Health and safety. To develop in each pupil desirable attitudes and practices with respect to health and safety.
6. Interest in achievement. To develop in each pupil a feeling of pride in his ability to do useful things and to develop certain worthy free-time interests, particularly in the crafts.
7. Habit of orderly performance. To develop in each pupil the habit of an orderly and efficient performance of any task.
8. Drawings and design. To develop in each pupil an understanding of all kinds of common graphic representations and the ability to express ideas by means of drawings and sketches.
9. Shop skills and knowledge. To develop in each pupil skill in the use of common tools and machines and an understanding of the problems involved in common types of construction and repair.¹

Some authorities believe that too much emphasis is being given to certain activities of the general education program and too little to others. However, the review of literature indicated almost unanimous agreement among specialists in the field of education that industrial arts has a definite place in the secondary school curriculum.

Industrial Arts and the School Curriculum

According to Wright the place of industrial arts in the space-age curriculum depends upon the industrial arts teacher and what activities he selects, the content of these activities, and the teaching methodology. Wright went on to express his opinion that

¹American Vocational Association, A Guide. . . , op. cit., pp. 19-28.

industrial arts in the curriculum was equally important for slow, average, and fast learners:

We have a program which is unique in the contribution that it can make to slow pupils. We have not always properly done what we ought to have done for the average and above average pupils. We surely know that our society today is basically industrial in nature and that industrial arts is usually offered as general education. It is an interpretation of industry through manipulative experiences. It seems logical that this phase of general education is just as important for fast learners as for slow learners.

It seems as though the space age before us should have an even more important place in the curriculum for industrial arts than has been the case in the past. Girls as well as boys need this work as a part of their general education core.¹

The potential of industrial arts for enriching the academic curriculum areas has been suggested by Napoleone as follows:

1. To assist in educational exploration related to the academic areas of general education.
2. To make partial use of shoproom facilities and its potential products in enriching units in language arts, social studies, and exact sciences.
3. To foster greater student interest and learning in academic subject matter.
4. To provide and aid in the development of teaching aids for academic subjects.²

Byram³ has pointed out that "The community secondary school

¹Wright, Lawrence S., "Space Age Industrial Arts," Industrial Arts and Vocational Education 48:224, October, 1959.

²Napoleone, Vincent O., "Time for Awakening!", Industrial Arts and Vocational Education 48:176-178, June, 1959.

³Byram and Wenrich, op. cit., p. 233.

should determine what it can do acceptably well, insofar as providing specific instruction is concerned, and should also recognize the things which it cannot do." He also noted that, "A special problem in this regard is faced by the smaller school. This school has a less flexible class schedule because of fewer sections, fewer teachers, and probably a narrower curriculum."

Significantly, Douglass¹, in speaking of curriculum offerings, maintained that, "It has been shown time and again by careful investigations that the pattern of subjects taken in the high school has little relationship to success in college, granted of course that for a few technical curricula, such as those of the engineering college, certain subjects like mathematics are indispensable."

Authors repeatedly stressed the principle of educational planning, namely, that the adequacy and effectiveness of programs are contingent upon the degree of citizen cooperation and participation in planning and evaluation. People of the community are the consumers of the product of their schools and should understand the nature and purpose of instruction in the work in which they are engaged or for which they are responsible. The product of industrial arts education, specifically, is influenced by many factors within the community.

Community Factors Influencing Industrial Arts Instructional Areas

Based upon the opinions of specialists in the field of industrial

¹Douglass, Harl R., Modern Administration of Secondary Schools, Ginn and Company, New York, 1954, p. 249.

arts education and industrial arts instructors from the State of Michigan, certain community factors were determined as significant in determining the instructional areas of an industrial arts program.

The highly significant factors are:

1. Financial prospects for industrial arts equipment.
2. Financial ability to obtain desired materials and supplies for the industrial arts program.
3. Financial prospects for industrial arts space.
4. Attitude of the school board toward an industrial arts program.
5. Training possessed by the industrial arts teaching personnel now employed.
6. Attitudes of the school administrative officers toward an industrial arts program.
7. Probable number of students to be enrolled in industrial arts in the foreseeable future (long range planning).
8. Kinds of industrial arts equipment present.
9. Proportion of dropouts that go into industries, service trades, professions, business, and farms.
10. Kinds of industries present in the community.
11. Financial prospects for hiring industrial arts teaching personnel.
12. Leisure time activities of the students of the community.
13. Culture of the community (whether the community is progressive and dynamic or static and opposed to change).¹

¹Irgang, Frank J., and Dalton, F. W., "Community Factors Determining Industrial Arts Instructional Areas," Industrial Arts and Vocational Education 45:213-214, September, 1956.

The following community factors were rated by the same group as moderately significant in determining the instructional areas of an industrial arts program:

1. Raw materials used or created in the community.
2. Business enterprises present in the community.
3. Proportion of pupils that leave the community after completing their education (graduates and dropouts).
4. Reading habits of the students of the community.
5. Whether the industrial arts courses are taken by students because no other course appears suitable for that student. ("He doesn't fit anywhere else.")
6. Reading habits of the adults of the community.
7. Dominant dwelling type of the community (apartments or homes).
8. Social rapport of the community (whether friction is created by special interest groups and pressure groups or whether the community is united for the common good).
9. Transportation facilities serving the school.
10. Ratio of persons in the upper, middle, and lower class status.
11. Public transportation facilities serving the community.¹

Competent authorities in industrial education have indicated that in the process of inaugurating or evaluating industrial arts education in a school program, it is important that community factors be included in the criteria used to determine the appropriate instruc-

¹Ibid., p. 214.

tional areas. It is equally important that personnel concerned are aware of recent concepts and current trends in industrial arts education.

Trends in Industrial Arts

The beginning of the industrial arts general shop was characterized by (1) representation of an industrial society through processes used by industry, (2) meeting the needs of young adolescents, and (3) making home life more meaningful to each. These ideas have apparently remained as the generally accepted contributions of industrial arts to general education.

The physical setting of industrial arts has changed to a much greater extent. From the crude early "shop" with hand tools, industrial arts has moved in many places to special modern laboratories equipped with flexible industrial type machines and hand tools as well.

Also emphasized in current literature is the contribution being made in the field of industrial arts by research and research studies. Much work is being done to help establish programs of teacher training and student instruction that are related to generally accepted and well founded principles.

In the writer's opinion, one of the best recent summaries of trends in industrial arts for the years 1900 to 1950 was presented by Schmitt¹ in the May, 1958, issue of Industrial Arts and Vocational

¹Schmitt, M. L., "Discernible Trends in Industrial Arts for the Past Half Century," Industrial Arts and Vocational Education 47:143-145, May, 1958.

Education Magazine. Trends in industrial arts philosophy, definition, objectives, curriculum, and other areas during the past 50 years are indicated in Table 1.

TABLE 1. SUMMARY OF TRENDS IN INDUSTRIAL ARTS FOR THE PAST HALF CENTURY (1900-1950)*

Trend	Past	Present
1. Philosophy	Variety of industrial understanding Meet needs of adolescents Making home life more meaningful Consumer education	Broad areas of industrial activity Problems relating to daily living
2. Definition	<u>Bonser</u> : Industrial arts is a study of the changes made by man in the forms of materials to increase their values, and of the problems of life related to these changes	<u>Carter V. Good</u> : A phase of the educational program concerned with orienting individuals through study and experience to the technical industrial side of society for the purpose of enabling them to deal more intelligently with consumer's goods, to be more efficient producers, to use leisure time more effectively and enjoyably, to have a greater appreciation of material culture, and to act more intelligently in regard to matters of health and safety, especially as effected by industry
3. Objectives	Emphasis on hand skill	1. Interest in industry

*Taken from the May 1958 issue of Industrial Arts and Vocational Education.

TABLE 1 (Continued)

Trend	Past	Present
	Exploration Avocational Consumer knowledge Handyman abilities	2. Appreciation and use 3. Self-realization and initiative 4. Co-operative attitude 5. Health and safety 6. Interest in achievement 7. Orderly performance 8. Drawing and design 9. Shop skills and knowledge
4. Curriculum	Woodworking Mechanical drawing	Drawing and planning Woodworking Metalworking Ceramics Textiles Electricity and radio Plastics Graphic arts Transportation and power Home mechanics
5. Pre-building stage	Some	Community co-operation Scientific Objective Planning guides Check sheets
6. Shop organization	Unit (one to two activities)	Comprehensive general shop (Work many areas)
7. Shop locations	Apart from on in basement	In a wing of the main building Ground floor
8. Shop size	Square, 1:1, irregular; 50 sq. ft. per pupil Ceilings 18 feet No color, drab	Rectangular 1:1½, 3:5 100 sq. ft. per pupil Ceilings 14-15 feet Color dynamics Noise control Visibility throughout

TABLE 1 (Continued)

Trend	Past	Present
9. Shop layout	Machine area Workbench	Planning Machine area Assembly area Workbench Storage facilities Area tools
10. Shop equipment	Heavy	Light weight Single purpose Safer Portable V Belts Simple design Dust collectors
11. Safety	Lack of adequate guarding	Guards Lines painted over danger zones Grounding of machines Fire extinguishers Hoods--exhausts Nonslip material Booth for welding Heating and venti- lating (ceiling)
12. Lighting	15-30 Ft.-candles at bench height	30-50 Ft.-candles at bench height Venetian blinds Single switch for each light Windows
13. Floors	Wood Concrete	Wood--general Concrete--not metals Resilient (in office, planning, art) Cork Rubber Mastic Asphalt tile
14. Utility outlets	Gas and electricity	Gas Water Electricity

TABLE 1 (Continued)

Trend	Past	Present
		Compressed air Telephone Clock Dismissal bell Fire alarms
15. Heating units	Floor or wall	Overhead
16. Plumbing	School lavatory	Drinking fountain Washing facilities Toilet or one nearby
17. Planning area	None	Drawing facilities Shop library Reference and planning materials Projector facilities Demonstration facilities Instructor's desk and materials Glass enclosed
18. Display	None or very little	Located in planning area Main corridors (Recessed in walls) In each activity
19. Workbench	Single type	Multiple
20. Tool procedure	Tool crib	Area tool panels
21. Finishing room	Separate	Part of shop proper enclosed

Literature revealed that in the opinion of national authorities industrial arts has, during the past 50 years, become more closely related to problems of daily living and industrial activity through use

of improved teaching methods, facilities, and equipment in schools.

Opinions of Montana school administrators regarding industrial arts in the small high school curriculum are presented in Chapter III.

CHAPTER III

OPINIONS OF SCHOOL ADMINISTRATORS REGARDING INDUSTRIAL
ARTS IN THE SCHOOL CURRICULUM

Prior to beginning this study of the place of industrial arts in the small Montana high school curriculum, a letter requesting suggestions and advice was sent to the supervisor of the Montana Trade and Industrial Education Service. The letter read in part:

As a special project for graduate study in education at Montana State College, I am considering conducting a survey of administrators of Montana Secondary Schools not having industrial arts programs in operation.

The purpose of the survey will be to determine the type of learning experiences considered important, the areas of instruction considered most worthwhile, and an over-all opinion by administrators of an industrial arts program which they feel would meet the needs of secondary education and be an acceptable addition to their present school curriculum.¹

The state supervisor replied that the proposed study appeared to be worthwhile and desirable as shown by the comments:

It appears to us you are undertaking a very worthwhile study, as outlined in your letter. . . .

There is a definite need to expand administrators knowledge and attitudes toward industrial arts programs. To our knowledge there has been no study made on this particular phase of industrial arts, up to the present time.²

¹Excerpt from a letter to W. Lyle Roeseler by the writer on March 10, 1960.

²Excerpt from a letter to the writer by W. Lyle Roeseler, Supervisor of Trade and Industrial Education, State of Montana, March 14, 1960.

Upon receipt of the letter from the state supervisor, a seven part questionnaire¹ was developed. The parts were designed to obtain from school administrators: (1) opinions of justification for not establishing industrial arts programs, (2) information about schools and administrators, (3) opinions of important areas of instruction in an industrial arts program, (4) opinions of appropriate and justifiable objectives for industrial arts programs, (5) opinions of areas in which industrial arts teachers need additional training, (6) specific information concerning an industrial arts program, and (7) evaluations of an industrial arts program.

Copies of the questionnaire were sent to administrators in 88 Montana high schools with enrollments of less than 400 students. The information obtained from the 58 (65.91%) administrators responding is presented in the seven sections of this chapter.

Justification for Not Establishing Industrial Arts Programs

Fifteen statements of justification for not establishing industrial arts programs in small Montana high schools were listed in Part I of the questionnaire. The administrators receiving the questionnaires were requested to check those reasons which they felt were appropriate to their particular situation. Some of the statements given were that a vocational agriculture program was offered in the school, that the community did not desire an industrial arts program, and that well

¹A copy of the questionnaire is included in Appendix A.

prepared teachers were not available. For a complete listing of the statements and the number and percentages of administrators' responses, refer to Table 2.

As shown in Table 2, a program in vocational agriculture was offered in 23 or 46.93% of the schools polled and the administrators in the majority of those schools felt that an industrial arts program would constitute at least a partial duplication of course offerings. Fourteen administrators offering vocational agriculture believed that that course, as offered in their schools, met the needs of both city and farm boys. One administrator in a school that does not offer either vocational agriculture or industrial arts had in effect what he called "a farm science program." He believed the program to be valuable and outlined it as follows:

We teach for a semester (3-6 weeks) a book-subject-film type program and the second semester have a regular shop program in a rented garage in town consisting of welding, carpentry, and tractor and auto mechanics. Most students in this program are farm boys who benefit directly from this practical experience. These students are not college bound. Others may take the shop program as a fifth subject and may be college bound students.¹

In eight or 16.32% of the communities surveyed, the administrator stated that the community did not desire an industrial arts program. A total of 23 (46.93%) of the schools polled had no shop building or room available and in three schools the shop was used by instructors of other classes. Shop equipment was not available in 30.61% of the

¹Comment by a school administrator to Part I, statements 1 and 2, of the questionnaire.

TABLE 2. NUMBER AND PER CENT OF RESPONDENTS USING STATEMENTS AS JUSTIFICATION FOR NOT ESTABLISHING AN INDUSTRIAL ARTS PROGRAM IN A HIGH SCHOOL.

Statements of justification	Affirmative replies					
	Group A*		Group B*		Total out of 49 possible replies	
	Number	Rank	Number	Rank	Number	Per cent Rank
A program in vocational agriculture is offered in the school	8	3	14	1	23	46.93 1
No shop building or room is available	10	1	13	2	23	46.93 1
School enrollment is too small	9	2	10	3	19	38.77 2
Shop equipment is not available	8	3	7	6	15	30.61 3
Sufficient local finances are not available	8	3	7	6	15	30.61 3
Vocational agriculture, as offered here, meets the needs of both city and farm boys	5	4	9	4	14	28.57 4
Storage facilities are not adequate	3	6	8	5	11	22.44 5
Well prepared teachers are not available	4	5	6	7	10	20.40 6
Instructional materials are lacking	4	5	4	8	8	16.32 7
The community does not desire an industrial arts program	4	5	4	8	8	16.32 7
No federal or state financial aid is available for an industrial arts program	4	5	3	9	7	14.28 8
Scheduling of classes would be too difficult	2	7	3	9	5	10.20 9
Students do not have funds to purchase supplies	3	6	0	11	3	6.12 10
The shop is used by instructors of other classes	2	7	1	10	3	6.12 10
Students lack interest in a shop program	2	7	0	11	2	4.08 11

*Group A = administrators who have had previous experience as administrators in schools with industrial arts programs, *Group B = administrators who have had no previous experience as administrators in schools with industrial arts programs.

schools, instructional materials were lacking in 16.32%, and storage facilities were not adequate in 22.44% of the schools questioned.

The lack of federal or state financial aid for an industrial arts program was believed justification for not establishing such a program in seven or 14.28% of the schools. It was further stated by 15 (30.61%) of the schools that sufficient local finances were not available. It was believed by 6.12% of the administrators that students do not have funds to purchase supplies required for industrial arts classes.

Scheduling of classes would be too difficult if an industrial arts program were initiated according to 10.20% of those questioned. A much larger group, 19 (38.77%) stated that in their school the enrollment was too small to justify an industrial arts program. On the other hand, one administrator commented, "I do believe some form of industrial arts is essential in a school no limit on the size of the school, 20 students or 2,000 students." Students were believed to lack interest in industrial arts programs in only two or 4.08% of the communities checked.

It is interesting to note that 10 (20.40%) of the administrators asked replied that well-prepared industrial arts teachers are not available. One individual commented at length in relation to this problem:

How many secondary teachers are prepared, through training, for more than one teaching field? In our small schools throughout Montana we need secondary teachers who have one major and two teaching minors. In some cases, two teaching majors would be very acceptable. . . . Except for AA schools in Montana we have a very definite need for secondary teachers who are qualified in more than one teaching field. . . . One secondary teacher, as a present

example of this, . . . has an economics and a philosophy minor field. Minors of this type do not fit into a secondary program very well in Montana schools.

In addition to vocational agriculture as a primary reason for not having industrial arts in a high school, the non-availability of a shop building or room ranked highest. Close behind as a means of justification for no industrial arts program came the matter of too small a school enrollment. Of least importance as a means of justification was the students' lack of interest in a shop program.

Information about Schools and Administrators

In Part II of the questionnaire, six questions were asked about either the school or the administrator: (1) Have you acquired a new physical plant in the past ten years?, (2) Do you anticipate getting new facilities in the next five years?, (3) Has the school enrollment increased in the past five years?, (4) Do you anticipate adding an industrial arts program in the next five years?, (5) Have you dropped an industrial arts program in the past three years?, and (6) Have you ever been an administrator at a school with an industrial arts program?. Of the 58 schools responding, 25 (43.10%) had acquired a new physical plant in the past ten years. Thirty-one schools had not acquired a new plant during that time and two schools did not reply to this question.

New facilities were anticipated in the next five years by 15 (25.86%) of the administrators contacted; 38 (65.51%) did not foresee new physical facilities, and five did not answer the question.

The question, "Has the school enrollment increased in the past five years?", received an affirmative answer 63.79% of the time. The remainder of the schools, 36.21%, indicated no gain in enrollment.

Nine administrators replied that industrial arts was offered in their schools, and, therefore, the fourth and fifth questions in Part II of the questionnaire were not applicable to them. However, 49 schools did answer these two questions. Of these, 13 (26.53%) anticipated adding an industrial arts program within the next five years, 27 (55.10%) did not anticipate such a program, and 9 did not offer an opinion. Six schools had dropped an industrial arts program within the past three years.

In response to the final question in Part II, "Have you ever been an administrator at a school with an industrial arts program?", 32 or 55.17% of the administrators indicated that they had previously been administrators at schools with industrial arts programs. The remaining 44.83% stated that they had had no previous experience as administrators at schools with industrial arts programs. Answers received in response to this question were used as the basis for separating into two groups answers furnished to all subsequent parts of the questionnaire.

The third part of the questionnaire listed 10 areas of instruction in an industrial arts program and asked administrators to rate those areas as to the relative importance of each. Response to this part of the questionnaire is given in the following section.

Important Areas of Instruction in an Industrial Arts Program

The areas of instruction in an industrial arts program were rated on the questionnaire by administrators by using the numbers one to four to indicate relative importance. To get a reliable indication of importance, a tabulation was made in four ways: Columns A_1 and B_1 of Table 3 (also see Part III of the copy of A Summary of Responses. . . in Appendix B) indicating a rating according to the total number of times each area was ranked most important; A_2 and B_2 indicating a rating according to the total number of times each area was ranked either first or second in importance; A_p and B_p indicating a rating determined on the basis of assigning points (a rank of one received five points, a rank of two received four points, a rank of three received three points, a rank of four received four points, and an area which was checked but not rated by number received one point). An average of the ranks indicated in all columns was then made in order to get a more accurate view of the administrators' opinions as to the relative importance of the areas of instruction.

The tabulation of opinions is given in Table 3. All A ratings indicate opinions of administrators who have had previous experience as administrators in schools with industrial arts programs; B ratings indicate opinions of administrators who have had no previous experience as administrators in schools with industrial arts.

TABLE 3. SCHOOL ADMINISTRATOR'S RATINGS OF IMPORTANCE OF TEN AREAS OF INSTRUCTION IN AN INDUSTRIAL ARTS PROGRAM

Area of instruction	Rating by administrator group*						Average rating
	A ₁	A ₂	A _p	B ₁	B ₂	B _p	
Woodwork	1	2	1	1	1	1	1
Carpentry	2	1	2	2	2	2	2
Auto mechanics	3	3	3	5	3	3	3
Welding	4	6	6	3	4	5	4
Electricity	6	5	4	6	5	4	5 - 6
Mechanical drawing	5	4	5	4	6	6	5 - 6
Machine shop	7	7	8	7	8	8	7
Crafts (Art metal, leather, plastics)	8	8	7	9	10	10	8
Plumbing	9	9	9	8	9	9	9
Sheet metal	10	10	10	10	7	7	10

*Groups "A" = administrators with previous experience with industrial arts programs, Groups "B" = administrators without previous experience with industrial arts programs, Subscripts "1" = ratings by number of times the area was rated in first place, Subscripts "2" = ratings by number of times the area was rated first or second, Subscripts "p" = ratings obtained through use of a point system.

It can be seen from Table 3 that woodwork, long considered important as an area of instruction in industrial arts, was almost unanimously chosen as the most important area of instruction by administrators of the 58 small high schools responding to the questionnaire. Carpentry received a definite second place rating, auto mechanics--third

place, and welding was fourth in importance. Electricity and mechanical drawing tied in the average rating for fifth or sixth place. Machine shop drew seventh place, crafts was rated eighth by a narrow margin over the ninth place plumbing area. Sheet metal was considered least important of the 10 areas of instruction rated in the survey.

Other areas of instruction that were considered important by some individuals and furnished by comment to the questionnaire were: farm mechanics, glass usage, lapidary work, individual tool skills, general household appliance maintenance for girls, lawn and garden care-taking, greenhouse practices, and livestock raising.

It is important to realize, as it appeared that most administrators did, that the selection of important instructional areas must be based upon appropriate and justifiable objectives for industrial arts programs.

Appropriate and Justifiable Objectives for Industrial Arts Programs

The statements of the objectives of industrial arts selected for use in Part IV of the questionnaire were those objectives set forth by the American Vocational Association¹ in 1953. Directions in the questionnaire instructed the administrators to check only those objectives which they ~~believed to be~~ appropriate and justifiable for an industrial arts program in their community. The statements and responses are listed in Table 4.

¹American Vocational Association, A Guide. . . , op. cit., pp. 19-28.

TABLE 4. NUMBER AND PER CENT OF SCHOOL ADMINISTRATORS SELECTING CERTAIN OBJECTIVES AS APPROPRIATE AND JUSTIFIABLE FOR AN INDUSTRIAL ARTS PROGRAM

Appropriate and justifiable objectives	Extent of selection						
	Group A*		Group B*		Total out of 58 possible replies		
	Number	Per cent	Number	Per cent	Number	Per cent	Rank
To develop skill in the use of common tools and machines and an understanding of the problems involved in common types of construction and repair	26	81.25	21	80.77	47	81.03	1
To develop the habit of an orderly and efficient performance of any task	22	68.75	17	65.38	39	67.24	2
To develop a feeling of pride in the ability to do useful things and to develop certain worthy free-time interests, particularly in the crafts	21	65.63	17	65.38	38	65.51	3
To develop the habits of self-reliance and resourcefulness in meeting practical situations	20	62.50	18	69.23	38	65.51	3
To develop the appreciation of good design, materials, and workmanship, and the ability to select, care for, and use industrial products wisely	20	62.50	11	42.31	31	53.44	4
To develop an understanding of all kinds of common graphic representations and the ability to express ideas by means of drawings and sketches	13	40.63	10	38.46	23	39.65	5
To develop desirable attitudes and practices with respect to health and safety	12	37.50	11	42.31	23	39.65	7
To develop a readiness to assist others and to join in socially accepted group undertakings	8	25.00	7	26.92	15	25.86	6

TABLE 4 (Continued)

Appropriate and justifiable objectives	Extent of selection						
	Group A*		Group B*		Total out of 58 possible replies		
	Number	Per cent	Number	Per cent	Number	Per cent	Rank
To develop an active interest in industrial life and in the methods and problems of production and exchange	6	18.75	4	15.38	10	17.24	7

*Group A = administrators who have had previous experience as administrators in schools with industrial arts programs, *Group B = administrators who have had no previous experience as administrators in schools with industrial arts programs.

Ten administrators (17.24% of those responding) believed that development of an active interest in industrial life and in the methods and problems of production and exchange was a valid objective in their community. Thirty-one (53.44%) of the respondents indicated their belief in the objective of developing the appreciation of good design, materials, and workmanship, and the ability to select, care for, and use industrial products wisely.

Development of the habits of self-reliance and resourcefulness in meeting practical situations was thought to be an appropriate and justifiable objective of industrial arts in 38 (65.51%) of the schools reporting. To develop a readiness to assist others and to join in socially accepted group undertakings was considered important in only

15 (25.86%) of the communities. More than one-third (39.65%) of those questioned indicated approval of developing desirable attitudes and practices with respect to health and safety.

Development of a feeling of pride in the ability to do useful things and to develop certain worthy free-time interests, particularly in the crafts, was checked as a valid objective in 38 (65.51%) of the questionnaires returned. Still a larger number, 39 (67.24%) of those reporting believed that development of the habit of an orderly and efficient performance of any task was a worthy objective of industrial arts. Twenty-three (39.65%) of the individuals asked expressed the opinion that development of an understanding of all kinds of common graphic representations and the ability to express ideas by means of drawings and sketches was an appropriate and justifiable objective of an industrial arts program in their community.

Forty seven (81.03%) of the administrators, the largest number responding to any single question in this part of the questionnaire, indicated the objective of developing skill in the use of common tools and machines and an understanding of the problems involved in common types of construction and repair was an important objective.

In addition to opinions of the objectives of an industrial arts program and their relation to individual schools, administrators' opinions about the thoroughness of industrial arts teacher training were desired. The opinions stated reveal the areas in which teacher training is apparently weakest.

Areas in Which Industrial Arts Teachers Need Additional Training

Administrators who had previously been associated with industrial arts teachers indicated need for additional training of industrial arts teachers in seven areas. These areas are illustrated in Figure 1.

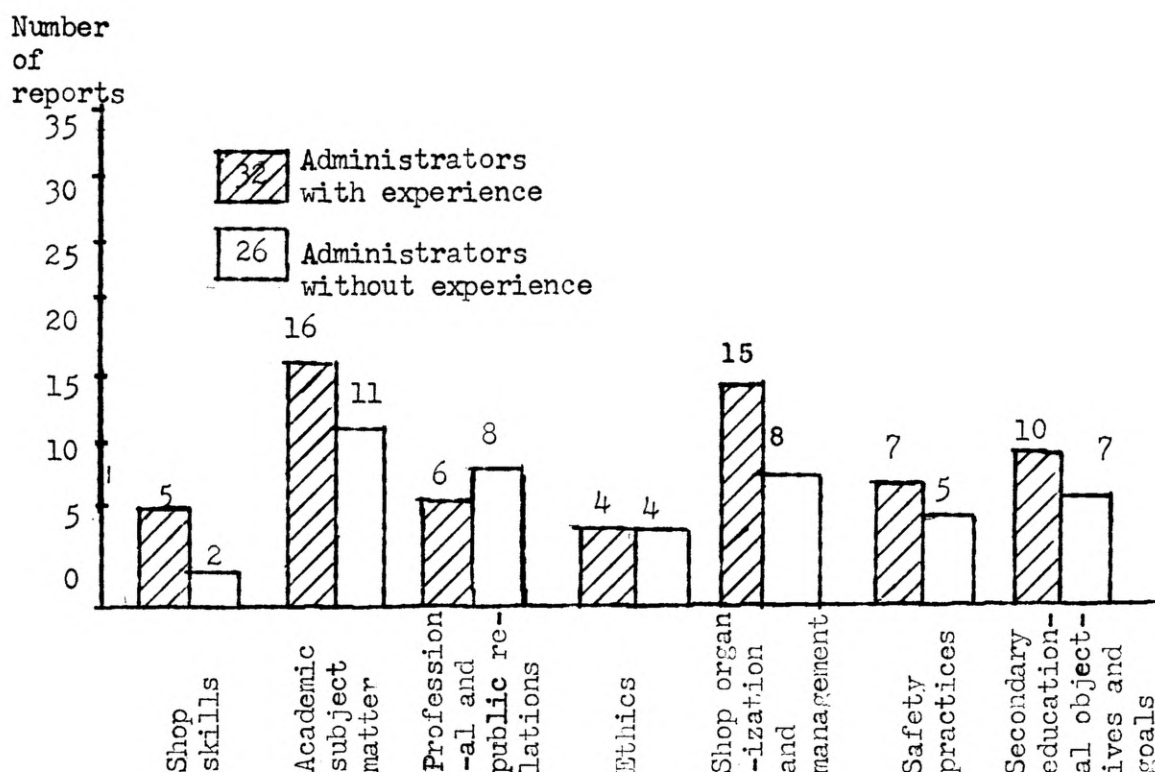


Figure 1. Number of Administrators Reporting Need for Additional Training of Industrial Arts Teachers in Seven Areas

Industrial arts teachers need additional training in the area of shop skills 12.06% of the time, in academic subject matter 46.55% of the time, and in professional and public relations 24.13% of the time as shown in Figure 1. Ethics was indicated as a shortcoming of industrial

arts teachers by 13.79% of the administrators questioned; teachers were weak in shop organization and management according to 39.65% of the respondents; safety practices were not sufficiently well learned by industrial arts teachers in the opinion of 20.68% of the administrators; and secondary educational objectives and goals were not clearly understood in 29.31% of the cases.

Information received in reply to the questions in Part VI of the questionnaire is revealed in the following section. The questions asked for information about three specific factors concerning an industrial arts program.

Specific Information Concerning an Industrial Arts Program

Information was requested regarding (1) the offering of courses in industrial arts to both boys and girls, (2) the most desirable length of industrial arts class periods, and (3) the portion of the time allowed for industrial arts that should be devoted entirely to teaching manipulative skills. The responses received are shown in Tables 5, 6, and 7 respectively.

Almost one-fourth, 22.41%, of the administrators said that industrial arts should be offered to boys only. Significantly, not one said that industrial arts should be offered to girls only. While another 10.34% of the administrators questioned were undecided on this issue, the overwhelming majority, 67.25%, believed that industrial arts has its virtues when offered to both boys and girls. Many of those making the latter statements also said that they preferred separate

TABLE 5. NUMBER AND PER CENT OF ADMINISTRATORS STATING OPINIONS OF OFFERING INDUSTRIAL ARTS COURSES TO BOYS ONLY, BOYS AND GIRLS, OR GIRLS ONLY

Class members desired							
Boys only		Boys and girls		Girls only		Undecided	
Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
13	22.41	39	67.25	0	0	6	10.34

TABLE 6. NUMBER AND PER CENT OF ADMINSTRATORS STATING OPINIONS OF THE APPROPRIATE LENGTH OF INDUSTRIAL ARTS CLASS PERIODS

Length of class period desired									
45 minutes		90 minutes		1 hour		2 hours		Undecided	
Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
1	1.73	15	25.86	32	55.18	4	6.89	6	10.34

classes for the sexes.

In regard to the length of class periods, the majority, 55.18% preferred classes of one hour duration. Slightly more than one-fourth, 25.86%, desired a 90 minute class period; 10.34% were undecided on a desirable class length; 6.89% believed in a two hour class; and the remaining 1.73% upheld a short 45 minute period. Some administrators commented that the length of the period would depend on other class

schedules.

Of the time designated for industrial arts classes, 25.86% of the respondents said that 50 to 60% of that time should be devoted entirely to teaching manipulative skills. An equally large group, 25.86%, was in favor of teaching manipulative skills from 70 to 80% of the time, while still another identical group of 25.86% was undecided as to the best procedure. Only 18.97% of the individuals questioned believed in teaching manipulative skills 60 to 70% of the time. The minority, 3.45%, thought that manipulative skills should utilize from 80 to 90% of the class time.

TABLE 7. NUMBER AND PER CENT OF ADMINISTRATORS STATING OPINIONS OF THE PORTION OF INDUSTRIAL ARTS CLASS PERIODS THAT SHOULD BE DEVOTED ENTIRELY TO TEACHING MANIPULATIVE SKILLS

Portion of class time desired for teaching manipulative skills									
50 - 60%		60 - 70%		70 - 80%		80 - 90%		Undecided	
Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
15	25.86	11	18.97	15	25.86	2	3.45	15	25.86

As a means of getting an overview of administrator's attitudes towards the place of industrial arts in the high school curriculum, eight general statements were placed for evaluation in the final part of the questionnaire. Those statements and the responses are presented in the following section.

Administrators' Evaluations of an
Industrial Arts Program

Industrial arts is an important part of the total secondary educational program according to 41 (70.68%) of the administrators returning the questionnaire. It is of value to a vocational guidance program say 47 (81.03%) of the administrators and in a lesser number of cases, 32 (55.17%), a good industrial arts program is an effective aid in achieving and maintaining desirable public relations.

Thirty-two people (55.17%) stated that a course of study in industrial arts should be prepared as required by each individual school. A somewhat larger number, 41 (70.68%), indicated that a state course of study would be valuable for use as a guide in instruction. A handbook designed to present worthwhile material for an industrial arts program was anticipated as being helpful by 47 (81.03%) of the school superintendents.

A state supervisor in industrial arts was not believed to be needed at this time to aid in coordinating industrial arts with the whole school program and to promote community interest in an industrial arts program. More specifically, 39 (67.24%) of those questioned said that such a supervisor was not needed, 15.51% stated a need for such a person, and the remainder declined to state an opinion.

The final statement in the questionnaire regarding industrial arts was: "Industrial arts, as an exploratory course, should be required in grades seven and eight." This statement was considered valid by 29.31% of the superintendents while 56.39% emphatically disagreed.

Summary

Administrators of small Montana high schools indicated that the presence of a vocational agriculture program in their school and/or non-availability of a shop building or room were the two major justifications for not establishing industrial arts programs.

High school enrollments had increased during the past five years according to 63.79% of the school administrators but only 26.53% anticipated adding an industrial arts program within the next five years. Significantly, of the 58 administrators responding, over one-half stated that they had previously been administrators at schools with industrial arts programs.

The areas of instruction in an industrial arts program that were considered most important were woodworking and carpentry. Automotive mechanics and welding were also favorably considered.

"Development of skill in the use of common tools and machines and an understanding of the problems involved in common types of construction and repair," according to administrators of small Montana high schools, is the most important objective of industrial arts.

Schools administrators thought that industrial arts teachers needed more training in academic subject matter but usually had adequate training in shop skills.

More than two-thirds of the administrators expressed desire to have both boys and girls in industrial arts classes although many believed in separate classes for the sexes. The most desirable class length was one hour and it was believed that from 50% to 80% of that

time should be devoted to teaching manipulative skills.

Perhaps the most significant statement made by Montana school administrators was that industrial arts is an important part of the total secondary educational program. More than 70% of the administrators agreed on that.

A summary of the purpose of this investigation with the writer's conclusions and recommendations are presented in Chapter IV.

CHAPTER IV

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The purpose of this investigation was to examine industrial arts education to determine the place of industrial arts in the small Montana high school curriculum.

The review of literature indicated that industrial arts is considered an integral part of general education but authors fail to agree on a single definition of it. The most comprehensive and widely used definition of industrial arts was set forth in 1954 by the American Vocational Association. It describes industrial arts as:

Instructional shopwork of a non-vocational type which provides general educational experiences centered around the industrial and technical aspects of life today and offers orientation in the areas of appreciation, production, consumption, and recreation through actual experiences with materials and goods.¹

It was determined that the important needs of individuals are being met in flexible industrial arts programs which are now commonplace in secondary schools throughout the nation. Reports in literature also indicated that cultural values, societal needs, and learner's backgrounds serve as guides to curriculum development and that industrial arts teachers should have a broad background of

¹American Vocational Association, Definitions of Terms in Vocational and Practical Arts Education, Committee on Research and Publications, The Association, Washington, D. C., 1954, p. 15.

preparation designed for furnishing a wide cultural foundation for effective all-round teaching.

The Peabody Report¹ on Montana schools indicated that not many schools in Montana are meeting their responsibilities in the provision of industrial arts and shop experiences for youth. The report pointed out that industrial arts offerings are found in less than one-half of the high schools of Montana and in many of these the experiences are limited to woodshop and/or mechanical drawing.

The questionnaire that was developed and sent by the writer to 88 administrators of high schools in Montana not having industrial arts programs with enrollments of less than 400 students was completed and returned by 58 of those administrators.

More than 70% of the administrators responding to the questionnaire believed that industrial arts is an important part of the total secondary educational program and almost that many stated that classes should be provided for both boys and girls. Forty-nine schools without industrial arts programs indicated that, in general, the reason for not having an industrial arts program was either due to lack of a shop building or room, or because a vocational agriculture program was offered in the school.

¹Public Schools of Montana, A Report to Montana Taxation-Education Commission, Division of Surveys and Field Services, George Peabody College for Teachers, Nashville, Tenn., 1958, 72 pp.

Conclusions

Several conclusions drawn from a review of literature are:

1. There is no standard definition of industrial arts although there is general agreement among authorities that industrial arts is instructional shopwork related to problems of daily living and industrial activity.
2. Industrial arts is almost unanimously considered by authorities as an integral part of general education.
3. A good industrial arts program in a high school curriculum must be flexible and adjusted around the cultural values, societal needs, and learner's backgrounds in each community.
4. Industrial arts teachers should receive a broad background of preparation that includes English, social science, music, art, humanities, and psychology in addition to the necessary courses in science, mathematics, and the practical arts.
5. Many Montana high schools are either providing no instruction or a very narrow range of experiences in the field of industrial arts.

The results of the survey of administrators of small high schools in Montana that do not have industrial arts programs led to these conclusions:

1. The absence of industrial arts from the curriculum of many small Montana high schools is due not to the attitudes of the administrators towards an industrial arts program but largely to a lack of school plant facilities or equipment, small school enrollment, and/or insufficient local finances to support a program.
2. Administrators of small Montana high schools believe that the outstanding objective of industrial arts education is to develop skill in the use of common tools and machines and an understanding of the problems involved in common types of construction and repair.
3. A broadened industrial arts type program, utilizing a

variety of media and skills, should be encouraged in many of the small high schools of Montana.

4. Industrial arts teachers need a broader background of preparation than that previously provided by teacher training institutions.
5. In Montana as well as nationally, industrial arts is considered an integral part of general education.

Recommendations

The findings of the review of literature and the survey of administrators of small Montana high schools indicated certain implications regarding teacher training and the need for further studies in industrial arts education in Montana. One of the implications was that shop experiences should be designed primarily to aid in developing the general educational program.

Teacher training institutions should place additional emphasis on broadening the background of industrial arts teachers, especially in the areas of English, social science, humanities, and psychology. The basic objectives and goals of general education and the importance of desirable professional and public relations should be more forcefully emphasized by industrial arts teacher trainers.

It is recommended that a complete study be made of industrial arts education in secondary schools of Montana to determine methods for improving services provided by industrial arts to general education.

It is finally recommended that teacher training institutions in Montana encourage industrial arts teacher candidates to meet state certification requirements in two minor academic fields so that they may more easily meet the needs of small Montana high schools and thereby

provide a means of presenting industrial arts programs, even though limited, to a larger number of students.

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APPENDIX

APPENDIX A

Industrial Arts Department 56
Montana State College
Bozeman, Montana
April 5, 1960

Dear Mr.

There has been much confusion and misunderstanding in the past regarding industrial arts in secondary education. Recently the American Vocational Education Association defined industrial arts as, "Instructional shopwork of a non-vocational type which provides general educational experiences centered around the industrial and technical aspects of life today and offers orientation in the areas of appreciation, production, consumption, and recreation through actual experiences with materials and goods. It also serves as exploratory experiences which are helpful in the choice of a vocation."

Currently a study to determine the need for improvement of industrial arts in Montana Secondary Schools is being conducted at Montana State College by James Olson. Of the fifty-two schools polled to date, 96% indicate that industrial arts is of significant value to their general educational program.

It is my intention to supplement this study by questioning administrators of Montana Secondary Schools with enrollments up to four hundred which do not have industrial arts programs. This group of administrators of which you are a member can, we are sure, be of valuable assistance to us in improving the training of teachers for a more appropriate and widely acceptable industrial arts program in Montana Secondary Schools. In fact, the State Department of Public Instruction has indicated an interest in this survey.

Therefore, I am respectfully submitting the enclosed questionnaire, hoping it will be possible for you to find time in your busy schedule to complete and return it promptly for consolidation with others as a part of a special graduate report in education.

All questionnaires remain confidential, no school or administrator's name will be used, and all materials will be destroyed upon completion of the final report. You will be furnished a copy of the final tabulation of responses.

Thank you for your part in helping me complete this survey.

Sincerely yours,

Henry L. Parsons
Graduate Student

Enclosure

A QUESTIONNAIRE TO DETERMINE AN APPROPRIATE
INDUSTRIAL ARTS PROGRAM FOR MONTANA SECONDARY SCHOOLS
WITH ENROLLMENTS UP TO FOUR HUNDRED

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PART I

Directions: Check the statements which you feel have been justification for not establishing an industrial arts program in your school.

- () 1. A program in vocational agriculture is offered in the school.
- () 2. Vocational agriculture, as offered here, meets the needs of both city and farm boys.
- () 3. The community does not desire an industrial arts program.
- () 4. No shop building or room is available.
- () 5. The shop is used by instructors of other classes.
- () 6. Shop equipment is not available.
- () 7. Instructional materials are lacking.
- () 8. Storage facilities are not adequate.
- () 9. No federal or state financial aid is available for an industrial arts program.
- () 10. Sufficient local finances are not available.
- () 11. Students do not have funds to purchase supplies.
- () 12. Scheduling of classes would be too difficult.
- () 13. School enrollment is too small.
- () 14. Students lack interest in a shop program.
- () 15. Well prepared teachers are not available.

PART II

Directions: Check the following questions as they apply to your school or to you.

Yes No

- () () 1. Have you acquired a new physical plant in the past ten years?
- () () 2. Do you anticipate getting new facilities in the next five years?
- () () 3. Has the school enrollment increased in the past five years?

Yes No

- () () 4. Do you anticipate adding an industrial arts program in the next five years?
- () () 5. Have you dropped an industrial arts program in the past three years?
- () () 6. Have you ever been an administrator at a school with an industrial arts program?

PART III

Directions: In Column I, rate the four most important areas of instruction in an industrial arts program. Use the numbers 1 to 4; 1 being the most important--4 the least important. Check all other areas you feel would be desirable. In Column II, check the areas now existing in your vocational agriculture program. Leave Column II blank if your school does not have a vocational agriculture program.

<u>Area</u>	<u>Important or desirable</u>	<u>Existing in Vo-Ag</u>
Auto Mechanics	()	()
Carpentry	()	()
Crafts (Art metal, leather, plastics)	()	()
Electricity	()	()
Machine Shop	()	()
Mechanical Drawing	()	()
Plumbing	()	()
Sheet Metal	()	()
Welding	()	()
Woodwork	()	()
Others;		
_____	()	()
_____	()	()
_____	()	()

Directions: Check only the following objectives which you believe would be appropriate and justifiable for an industrial arts program in your community.

- () 1. To develop an active interest in industrial life and in the methods and problems of production and exchange.
- () 2. To develop the appreciation of good design, materials, and workmanship, and the ability to select, care for, and use industrial products wisely.
- () 3. To develop the habits of self-reliance and resourcefulness in meeting practical situations.
- () 4. To develop a readiness to assist others and to join in socially accepted group undertakings.
- () 5. To develop desirable attitudes and practices with respect to health and safety.
- () 6. To develop a feeling of pride in the ability to do useful things and to develop certain worthy free-time interests, particularly in the crafts.
- () 7. To develop the habit of an orderly and efficient performance of any task.
- () 8. To develop an understanding of all kinds of common graphic representations and the ability to express ideas by means of drawings and sketches.
- () 9. To develop skill in the use of common tools and machines and an understanding of the problems involved in common types of construction and repair.

PART V

Directions: Insert checks in applicable spaces and complete the statement if desired.

From previous association with industrial arts teachers, it is apparent that they need additional training in: () shop skills, () academic subject matter, () professional and public relations, () ethics, () shop organization and management, () safety practices, () secondary educational objectives and goals, and/or _____

Directions: Insert checks in applicable spaces and comment if desired.

1. Courses in industrial arts should be offered to: () boys only,
() boys and girls, () girls only. Comments: _____

2. The length of class periods for industrial arts should be:
() 45 minutes, () 90 minutes, () 1 hour, () 2 hours. Comments: _____

3. Approximately what portion of the time allowed for industrial arts should be devoted entirely to teaching manipulative skills? () 50-60%,
() 60-70%, () 70-80%, () 80-90%. The remainder of the time will be used to teach related subject matter. Comments: _____

PART VII

Directions: Your honest opinion of the validity of the following statements is desired.

<u>Yes</u>	<u>No</u>	<u>Statements for Evaluation</u>
()	()	1. Industrial arts is an important part of the total secondary educational program.
()	()	2. Industrial arts is of value to a vocational guidance program.
()	()	3. A good industrial arts program is an effective aid in achieving and maintaining desirable public relations.
()	()	4. A course of study in industrial arts should be prepared as required by each individual school.
()	()	5. A state course of study for use as a guide in instruction would be valuable.
()	()	6. A handbook designed to present worthwhile material for an industrial arts program would be helpful.
()	()	7. A state supervisor in industrial arts is needed to aid in coordinating industrial arts with the whole school program and to promote community interest in an Ia program.
()	()	8. Industrial arts, as an exploratory course, should be required in grades seven and eight.

APPENDIX B

Industrial Arts Department
Montana State College
Bozeman, Montana
May 9, 1960

Dear Mr.

A final tabulation of responses to the questionnaire to determine an appropriate industrial arts program for Montana Secondary Schools with enrollments up to four hundred has been completed. Fifty-eight school administrators participated in this survey.

A copy of the final summary is being furnished to give you some idea of the responses received from administrators throughout the state. In most parts of the questionnaire, results were compiled and have been listed in two groups. Group "A" indicates responses of administrators who have had previous experience as administrators in schools with industrial arts programs; group "B" indicates responses of administrators having no previous experience as administrators in schools with industrial arts programs.

I wish to take this opportunity to thank you for your cooperation and assistance in helping make possible a successful survey in this particular phase of education in Montana Secondary Schools.

Sincerely yours,

Henry L. Parsons
Graduate Student

Enclosure

A SUMMARY OF RESPONSES TO A QUESTIONNAIRE TO DETERMINE AN APPROPRIATE
INDUSTRIAL ARTS PROGRAM FOR MONTANA SECONDARY SCHOOLS
WITH ENROLLMENTS UP TO FOUR HUNDRED

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PART I

Information: The statements which were felt to have been justification for not establishing an industrial arts program in schools were checked as indicated below. Nine schools having industrial arts returned the questionnaire but did not check this part since it was not applicable to them.

<u>A</u>	<u>B</u>	
8	14	1. A program in vocational agriculture is offered in the school.
5	9	2. Vocational agriculture, as offered here, meets the needs of both city and farm boys.
4	4	3. The community does not desire an industrial arts program.
10	13	4. No shop building or room is available.
2	1	5. The shop is used by instructors of other classes.
8	7	6. Shop equipment is not available.
4	4	7. Instructional materials are lacking.
3	8	8. Storage facilities are not adequate.
4	3	9. No federal or state financial aid is available for an industrial arts program.
8	7	10. Sufficient local finances are not available.
3	0	11. Students do not have funds to purchase supplies.
2	3	12. Scheduling of classes would be too difficult.
9	10	13. School enrollment is too small.
2	0	14. Students lack interest in a shop program.
4	6	15. Well prepared teachers are not available.

PART II

Information: The following questions "as they apply to your school or to you" were answered as shown below. Answers furnished by the nine schools having industrial arts were not counted in questions 4 and 5.

<u>Yes</u>	<u>No</u>	<u>Ans</u>	
25	31	2	1. Have you acquired a new physical plant in the past ten years?
15	38	5	2. Do you anticipate getting new facilities in the next five years?
37	21	0	3. Has the school enrollment increased in the past five years?
13	27	9	4. Do you anticipate adding an IA program in the next five years?
6	37	6	5. Have you dropped an industrial arts program in the past three years?
32	26	0	6. Have you ever been an administrator at a school with an IA program?

PART III

Information: The areas of instruction in an IA program were rated on the questionnaire by using the numbers 1 to 4 to indicate relative importance. To get a reliable indication of importance, a tabulation was made in four ways: Columns A₁ and B₁ indicate a rating according to the total number of times each area was ranked most important; A₂ and B₂ indicate a rating according to the total number of times each area was ranked either first or second in importance; A_p and B_p indicate a rating determined on the basis of assigning points (a rank of 1 received 5 points, a rank of 2 received 4 points, a rank

of 3 received 3 points, a rank of 4 received 2 points, and an area which was checked but not rated by number received 1 point). An average of the ranks indicated in all columns was then made in order to get a more accurate view of your opinion as to the relative importance of the areas of instruction.

<u>Area</u>	<u>Ratings of relative importance in an IA program</u>						
	A ₁	A ₂	A _p	B ₁	B ₂	B _p	Average
Auto Mechanics	3	3	3	5	3	3	3
Carpentry	2	1	2	2	2	2	2
Crafts (Art metal, leather, plastics)	8	8	7	9	10	10	8
Electricity	6	5	4	6	5	4	5 - 6
Machine Shop	7	7	8	7	8	8	7
Mechanical Drawing	5	4	5	4	6	6	5 - 6
Plumbing	9	9	9	8	9	9	9
Sheet Metal	10	10	10	10	7	7	10
Welding	4	6	6	3	4	5	4
Woodwork	1	2	1	1	1	1	1

PART IV

Information: The following objectives "which you believe would be appropriate and justifiable for an industrial arts program in your community" were checked in the proportions indicated.

<u>A</u>	<u>B</u>	
6	4	1. To develop an active interest in industrial life and in the methods and problems of production and exchange.
20	11	2. To develop the appreciation of good design, materials, and workmanship, and the ability to select, care for, and use industrial products wisely.
20	18	3. To develop the habits of self-reliance and resourcefulness in meeting practical situations.
8	7	4. To develop a readiness to assist others and to join in socially accepted group undertakings.
12	11	5. To develop desirable attitudes and practices with respect to health and safety.
21	17	6. To develop a feeling of pride in the ability to do useful things and to develop certain worthy free-time interests, particularly in the crafts.
22	17	7. To develop the habit of an orderly and efficient performance of any task.

<u>A</u>	<u>B</u>	
13	10	8. To develop an understanding of all kinds of common graphic representations and the ability to express ideas by means of drawings and sketches.
26	21	9. To develop skill in the use of common tools and machines and an understanding of the problems involved in common types of construction and repair.

PART V

Information: The statement below was answered in the manner shown.

From previous association with industrial arts teachers, it is apparent that they need additional training in: $\frac{A}{5} \frac{B}{2}$ shop skills, $\frac{A}{16} \frac{B}{11}$ academic subject matter, $\frac{A}{6} \frac{B}{8}$ professional and public relations, $\frac{A}{4} \frac{B}{4}$ ethics, $\frac{A}{15} \frac{B}{8}$ shop organization and management, $\frac{A}{7} \frac{B}{5}$ safety practices, $\frac{A}{10} \frac{B}{7}$ secondary educational objectives and goals.

PART VI

Information: The statements below were answered in the proportion shown.

1. Courses in industrial arts should be offered to: $\frac{A}{7} \frac{B}{6}$ boys only, $\frac{A}{23} \frac{B}{16}$ boys and girls, $\frac{A}{0} \frac{B}{0}$ girls only, $\frac{A}{2} \frac{B}{4}$ No answer.

2. The length of class periods for industrial arts should be: $\frac{A}{1} \frac{B}{0}$ 45 minutes, $\frac{A}{9} \frac{B}{6}$ 90 minutes, $\frac{A}{18} \frac{B}{14}$ 1 hour, $\frac{A}{2} \frac{B}{2}$ 2 hours, $\frac{A}{2} \frac{B}{4}$ No answer.

3. Approximately what portion of the time allowed for industrial arts should be devoted entirely to teaching manipulative skills? $\frac{A}{8} \frac{B}{7}$ 50-60%, $\frac{A}{5} \frac{B}{6}$ 60-70%, $\frac{A}{11} \frac{B}{4}$ 70-80%, $\frac{A}{1} \frac{B}{1}$ 80-90%, $\frac{A}{7} \frac{B}{8}$ No answer.

PART VII

Information: The opinions given of the validity of the following statements are as indicated below.

<u>Yes</u>		<u>No</u>		<u>No</u>		<u>Statements for Evaluation</u>
<u>A</u>	<u>B</u>	<u>A</u>	<u>B</u>	<u>A</u>	<u>B</u>	
22	19	4	5	6	2	1. Industrial arts is an important part of the total secondary educational program.
24	23	4	0	4	3	2. IA is of value to a vocational guidance program.
18	14	6	6	8	6	3. A good IA program is an effective aid in achieving and maintaining desirable public relations.
16	16	10	4	6	6	4. A course of study in industrial arts should be prepared as required by each individual school.
22	19	5	3	5	4	5. A state course of study for use as a guide in instruction would be valuable.
27	20	1	1	4	5	6. A handbook designed to present worthwhile material for an industrial arts program would be helpful.
4	5	23	16	5	5	7. A state supervisor in industrial arts is needed to aid in coordinating IA with the whole school program and to promote community interest in an IA program.
8	9	19	14	5	3	8. Industrial arts, as an exploratory course, should be required in grades seven and eight.