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# Industrial Arts Teacher Preparation and Curriculum Content in the Public Secondary Schools of South Dakota

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**INDUSTRIAL ARTS TEACHER PREPARATION AND CURRICULUM  
CONTENT IN THE PUBLIC SECONDARY SCHOOLS  
OF SOUTH DAKOTA**

**BY**

**WAYNE LEROY SALMEN**

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**A thesis submitted  
in partial fulfillment of the requirements for the  
degree Master of Science, Department of  
Education, South Dakota State  
College of Agriculture  
and Mechanic Arts**

**August, 1959**

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INDUSTRIAL ARTS TEACHER PREPARATION AND CURRICULUM  
CONTENT IN THE PUBLIC SECONDARY SCHOOLS  
OF SOUTH DAKOTA

This thesis is approved as a creditable, independent investigation by a candidate for the degree, Master of Science, and acceptable as meeting the thesis requirements for this degree; but without implying that the conclusions reached by the candidate are necessarily the conclusions of the major department.

Thesis Adviser

Head of the Major Department

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## CHAPTER I

### INTRODUCTION

Most educators in South Dakota, as well as in the rest of the United States, recognize that the primary purpose of all education in our public schools is to train for citizenship in a democracy.<sup>1</sup> This means helping the individual student develop into a happy, well rounded, useful and successful citizen. If our goal is to be accomplished, every phase of education must contribute toward this end.

One of the main responsibilities of a citizen is that of participation in work of the community. This citizen will become a worker and a producer whether in commerce, professional pursuits, public service, agriculture, industry, or other occupations. General education must include provision for acquaintance with these areas, thus enabling the student to become a better citizen. Industrial arts in the general education curriculum acquaints the student with the area of industry.

Industrial arts, with its many representative fields of industrial activity, helps to interpret our industrial age. It emphasizes the fact that each individual is a consumer as well as a producer and presents a background of consumer knowledge which prepares students more wisely to select and purchase the products of industry. Industrial arts develops through actual experience, appreciation for materials and processes;

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<sup>1</sup>Industrial Arts: Its Interpretation in American Schools, Bulletin 1937, no. 34, p. 1, United States Department of the Interior, Office of Education, United States Government Printing Office: Washington, D. C., 1938.



this results in an aesthetic appreciation of goods used in everyday living. Through experimentation, exploration, and manipulation of materials, industrial arts is able to incorporate knowledge gained in other subject matter areas. Industrial arts provides a background for the clarification of problems related to the employer and the employee.

South Dakota has been, and still is, an agricultural state; yet it like other agricultural states, is being caught up in this industrial age. South Dakota is becoming industrialized in its agriculture and its pattern of general living. Factors such as the trend toward larger farms, the federal soil bank program, and the completion of four large Missouri river dams in South Dakota will have a tremendous impact upon the future industrial potential of this state. As South Dakota moves from an agrarian to an industrial state, the question arises, are we in the public schools meeting the students' changing needs? With agriculture becoming so mechanized fewer persons are required to operate a farm; thus some of the farmer's sons must look to the city for employment. Youth who must leave the rural areas should be trained so that they will be capable of finding their life's work in urban centers and can successfully compete with their urban contemporaries whose schools offer a broader program of training.<sup>2</sup> South Dakota has too few students benefiting from enriched or broadened curricula. The majority of our schools are organized around a college preparatory curriculum, which is geared to

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<sup>2</sup>Wayne C. Puttmann, "South Dakota Faces School District Reorganization", SDEA Journal, p. 16, South Dakota Educational Association: Pierre, South Dakota, April, 1959.

the 42%<sup>3</sup> of high school graduates going on to college. The main question is, what have South Dakota schools offered the 29%<sup>4</sup> who seek full-time employment upon high school graduation?

South Dakota has 258<sup>5</sup> organized public secondary schools. Of these schools, 146<sup>6</sup> claim to offer an industrial arts program, or at least some area of industrial arts. With industrial arts being offered in only approximately half of our schools, are we helping to meet the changing needs of South Dakota's youth?

#### Statement of the Problem

The problem in this study was to gather information concerning the industrial arts programs presently being offered in South Dakota secondary public schools, and the training of the instructors in charge of these programs.

It was believed that the answers to the following general questions would assist in drawing conclusions to the main problem:

1. At what grade levels is industrial arts being offered?

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<sup>3</sup>L. R. Palmerton, G. M. Fort, Don Scannell, "The High School Seniors of 1957--Where Are They in 1958?", SDEA Journal, pp. 18-20 South Dakota Educational Association: Pierre, South Dakota, April, 1958.

<sup>4</sup>Ibid.

<sup>5</sup>M. F. Coddington, Educational Directory of South Dakota Schools 1958-1959, inside front cover, Department of Public Instruction: Pierre, South Dakota, 1958.

<sup>6</sup>Industrial Arts Teachers 1958-1959, Department of Public Instruction, Division of Vocational Education: Pierre, South Dakota, 1958.

2. How much class time is being devoted to industrial arts?
3. Does the instructor teach additional subjects? If so, what?
4. Does the shop have adequate space and equipment?
5. Are students of low academic ability encouraged to enroll in industrial arts?
6. Does the instructor feel the need for a state industrial arts guide?
7. What areas within industrial arts are being offered in the present program?
8. What are the training and experience of the instructor?
9. Where did the instructor receive his training in the various areas of industrial arts?
10. Does the instructor feel that his college training adequately prepared him for teaching the various industrial arts areas?

#### Importance of the Study

It was felt that this study might contribute information concerning at least three major things:

1. A possible need for a greater number of industrial arts departments in our South Dakota secondary schools.
2. A need for expanding the industrial arts curricula in our secondary schools.
3. The extent to which our present teacher training programs are meeting the needs of our teachers.

It was known that many schools were offering industrial arts, but just how many and which schools was undetermined. Upon ascertaining just which schools were offering industrial arts, then the question arose as to how broad an industrial arts curriculum was being offered.

Since the writer has been working in an industrial arts teacher training department, he is vitally concerned with teacher training and preparation found among South Dakota secondary school industrial arts teachers. The findings will aid him, as well as others in the various industrial arts teacher training departments of the state, to more adequately meet the needs of prospective industrial arts teachers. It was felt that this, in turn, should result in enriched industrial arts offerings on the secondary school level.

#### Purpose

This study was made in an effort to determine pertinent information regarding the following:

1. What is the content of the industrial arts programs offered in the secondary public schools of South Dakota?
2. What steps can be taken to encourage broader industrial arts offerings in our secondary schools?
3. What standards or qualifications do the industrial arts teachers of South Dakota possess?
4. In what areas of industrial arts do the secondary school teachers feel inadequately prepared?

Questionnaires were sent to all secondary public school industrial

arts instructors. The responses of these instructors have been tabulated and the findings interpreted in light of the above problems. Recommendations have been made concerning qualifications of industrial arts instructors, and broadening of industrial arts curriculum content both on secondary and college levels, so that teacher preparation can be improved and secondary school industrial arts programs can also be expanded and improved.

#### Definition

Industrial arts has been defined in various ways. Bonser and Mossman<sup>7</sup> say that industrial arts is "a study of the changes made by man in the forms of materials to increase their values, and the problems of life related to these changes".

Fales<sup>8</sup> defines industrial arts as "the broad study of the materials, organization, tools, processes, products, jobs, and human problems of industry".

The most generally accepted definition of industrial arts is to be found in a United States Government publication on the subject:

Industrial arts is a phase of general education that concerns itself with the materials, processes, and products of manufacture, and with the contribution of those engaged in industry. The learnings come through the student's experiences with tools and materials and through the study of resultant conditions of life. It is a curriculum area rather than a sub-

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<sup>7</sup>Frederick G. Bonser and Lois Coffey Mossman, Industrial Arts for Elementary Schools, p. 5, The Macmillan Company: New York, N. Y., 1923.

<sup>8</sup>Roy G. Fales, Tentative Syllabus in Comprehensive General Shop, p. 3, University of the State of New York: Albany, N. Y., 1940.

ject or course, being comparable in this respect to the language arts. Industrial arts therefore has general values that apply to all levels, and in a continuous program these values are progressively intensive and are cumulative in their effect as the student advances in maturity.<sup>9</sup>

Wilber<sup>10</sup> more recently defines 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".

One of the most inclusive definitions is given in the Dictionary of Education edited by Good<sup>11</sup>; it states that industrial arts is:

... 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 affected by industry.

Industrial arts is quite often confused with vocational trade and industrial education, or what is often referred to as trade training. Industrial arts is exploratory and is considered a phase of general education. Industrial arts involves both a study of and experience with, the materials, processes, products, and occupations of an industrial society. Industrial arts enables the student to explore many areas; thus it may well be called pre-vocational, and provides a good opportu-

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<sup>9</sup>Industrial Arts: Its Interpretation in American Schools, loc. cit.

<sup>10</sup>Gordon O. Wilber, Industrial Arts in General Education, p. 2, International Textbook Company: Scranton, Penn., 1954.

<sup>11</sup>Carter B. Good, Dictionary of Education, pp. 215-216, McGraw-Hill Book Company: New York, N. Y., 1945.

nity for vocational guidance. Vocational trade and industrial education aims to prepare the student for useful and gainful employment by providing the necessary training in a specific occupation. While industrial arts fosters fine avocational pursuits and often provides wage earning capabilities, it is not specialized preparation for wage earning.

In referring to meeting needs of the student, Industrial Arts: Its Interpretation in American Schools states the following:

"...opportunity for exploratory experiences that have value for determining in what broad fields of human activities his interests lie".<sup>12</sup>

South Dakota industrial arts curricula are mainly composed of woodworking and mechanical drawing.<sup>13</sup> This is a good beginning, but in this fast growing industrial age we should not be content with a minimum type program. The program outlined by the Wisconsin Cooperative Educational Planning Program<sup>14</sup> is an example of a complete public school industrial arts offering (Table I).

Industrial Arts: Its Interpretation in American Schools points to the fact that "the schools of today need to interpret the ever increasing number of significant changes which press for consideration on

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<sup>12</sup>Industrial Arts: Its Interpretation in American Schools, op. cit., p. 7.

<sup>13</sup>Richard D. Anderson, The Need For Trade and Industrial Shop in South Dakota High Schools, p. 19, Unpublished Master's Thesis, University of Wyoming: Laramie, Wyoming, 1953.

<sup>14</sup>Philosophy and Objectives for Industrial Arts in the Wisconsin Schools, Curriculum Bulletin No. 19, Industrial Arts Bulletin No. 1, p. 38, Wisconsin Cooperative Educational Planning Program: Madison, Wisconsin, May, 1953.

TABLE I. INDUSTRIAL ARTS CURRICULUM<sup>15</sup>

14	To Be Determined by Individual's Specific Objectives:								1. Advanced Technical Training
13									2. College Preparatory
									3. Advanced General Education
									4. Part-time Education
	GENERAL COMPREHENSIVE SHOPS	GENERAL UNIT OR UNIT SHOPS							
GRADE LEVELS	12 Woods Metals 11 Electricity Graphic Arts Printing, Drawing and Design 10 Motor Mechanics Crafts 9 Others	Cabinetmaking	Bench Metal	Industrial Electricity	Auto Mechanics	Lapidary (Jewelery)	Hand Composition	Mechanical Drawing	
		Carpentry	Art Metal	Industrial Electronics	Diesel Mechanics	Ceramics	Presswork	Machine Drawing	
		Woodturning	Machine Shop	Wiring	Aircraft Mechanics	Plastics	Linotype	Architectural Drawing	
		Patternmaking	Sheet Metal	Radio	Driver Training	Leatherwork	Photography	Aircraft Drawing	
		Finishing and Decorating	Welding	Others	Others	Model Making and Carving	Block Printing	Commercial Drawing and Design	
		Upholstering	Foundry			Weaving and Basketry	Etching	Others	
		Millwork	Forging			Others	Silk Screen		
		Others	Aircraft Sheet Metal				Others		
			Others				Printing	Drawing & Design	
			General Woodworking (Selected Units)	General Metals (Selected Units)	General Electricity (Selected Units)	General Motor Mechanics (Selected Units)	General Crafts (Selected Units)	General Graphic Arts (Selected Units)	
4-5-6	Activity Center (or Room), i.e., handicraft work, etc.								
1-2-3	Coordinated Activities and Classroom Projects								

<sup>15</sup>Ibid.



every hand".<sup>16</sup> If this was true in 1938, surely it is true today. The bulletin goes on to state:

The school shop, for example, can no longer justify its program if youngsters only make traditional objects out of wood and then take them home as they did a generation ago. Functions of the modern program require a much more significant contribution. Such programs now provide for:

1. Activities in as many industries as school shops and laboratories will permit.
2. Use of typical and important industrial tools.
3. Experience in production methods.
4. Experience in handicrafts.
5. Acquaintance with the organization and operation of industrial and commercial enterprises.
6. Study of safe and hygienic ways of doing all types of work.
7. Practice in identifying the more important methods employed by industry.
8. Selection and use of some of the common products of industry.
9. Utilization of salvaged materials or products for project work.
10. Interpretation of the sources, principles, and applications of power, such as steam, water, internal combustion, and electricity.
11. Study of the origins and effects of significant inventions.
12. Study of materials from source to completed object.

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<sup>16</sup>Industrial Arts: Its Interpretation in American Schools,  
op. cit., p. 9.

13. Study of vocational opportunities, living conditions, remuneration of workers, controversial questions pertaining to capital, labor, and technology.<sup>17</sup>

The type of industrial arts shop established in a school should depend upon community needs, facilities, resources, as well as age and type of students. There are three main types of shops: the unit shop is concerned with one area or one material like mechanical drawing or welding; the general unit shop is concerned with a broad general area like metals, where forging, machine shop, sheet metal, welding, etc. would be taught; the comprehensive general shop provides work in more than one general area such as woodworking, metals, and electricity. For the most part, the shop organizations found in South Dakota follow either the general unit shop plan or the comprehensive general shop plan.

Industrial arts is no different from the other areas of the curriculum in that the instructor must give attention to desired changes or outcomes to be realized in the students. Definite objectives or goals must be stated and pursued if these outcomes are to be realized. The American Vocational Association in its bulletin, Improving Instruction in Industrial Arts, has listed the following objectives:

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 and workmanship, and the ability to select, care for, and use industrial products wisely.

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<sup>17</sup>Industrial Arts: Its Interpretation in American Schools, op. cit., pp. 9-10.

3. **Self-Discipline and Initiative**--to develop in each pupil the habits of self-reliance, self-discipline, and resourcefulness in meeting practical situations.
4. **Cooperative Attitudes**--to develop in each pupil a readiness to assist others and to join happily in group undertakings.
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 worthy leisure-time interests.
7. **Orderly Performance**--to develop in each pupil the habit of an orderly, complete, and efficient performance of any task.
8. **Drawing and Design**--to develop in each pupil an understanding of drawings, and the ability to express ideas by means of drawing.
9. **Shop Skills and Knowledge**--to develop in each pupil a measure or skill in the use and care of common tools and machines, and an understanding of the problems involved in common types of construction and repair.<sup>18</sup>

#### Scope and Limitations

This study was conducted using all industrial arts instructors, or any instructor teaching in any one of the areas of industrial arts, in the public secondary schools of South Dakota. The data obtained were for the school year 1958-1959.

The list, Industrial Arts Teachers 1958-1959,<sup>19</sup> was obtained from C. O. Gottschalk, state supervisor of trade and industrial education. This list was compared with A List of the Elementary and Secondary School

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<sup>18</sup>Improving Instruction in Industrial Arts, pp. 50-59, American Vocational Association, Incorporated: Washington, D. C., 1948.

<sup>19</sup>Industrial Arts Teachers 1958-1959, loc. cit.

Teachers in all South Dakota Schools Offering High School Work for the School Year 1958-1959,<sup>20</sup> which lists the subjects taught by each instructor in the state. Several discrepancies were noted between lists. A number of vocational agriculture teachers on the latter list were considered industrial arts instructors on the former. Upon checking with H. W. Gadda, head teacher trainer in agricultural education, South Dakota State College, several instructors were eliminated from the Industrial Arts Teachers 1958-1959 list. Vocational agriculture has a shop program; however, if the instructor is listed with H. W. Gadda as a full-time vocational instructor, the shop program he is offering is concerned with a vocational agriculture program. However, there are some instances in which vocational agriculture teachers are also conducting limited industrial arts programs.

After state, parochial, and private schools were eliminated from the list of Industrial Arts Teachers 1958-1959 and the discrepancies were solved, the questionnaires were sent.

Any study using a questionnaire is necessarily subjective in nature; thus it has many limitations. The length and formality of a questionnaire is a determinant on per cent return, as well as how completely or accurately the questionnaire is answered. In a study covering a vast geographical area, it is impractical to make first-hand observations. The questionnaire becomes the second best means of

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<sup>20</sup>Margaret Hengel, A List of the Elementary and Secondary School Teachers in all South Dakota Schools Offering High School Work for the School Year 1958-1959: Pierre, South Dakota, 1958

collecting data;<sup>21</sup> however it is seldom that 100 per cent response is obtained in this manner, thus another limitation. The validity of the questionnaire rests entirely upon the integrity of the instructor responding. Although every effort was made to have the questions clear and easily understood, there is always the possibility of misinterpretation. It could have been expanded to include teacher philosophy, shop equipment, salary, etc.

The investigation was limited to the industrial arts offerings in 1958-1959. It might have concerned past years or future plans for the various industrial arts programs.

From this data conclusions can only be drawn concerning South Dakota. A national survey might have been conducted so that South Dakota programs could be compared with the other states. Not only was this area limited to South Dakota, but it was limited to public secondary schools. More value might have been placed in the findings had nonpublic school industrial arts programs been studied and compared both in South Dakota and the other states.

The secondary level was the primary concern of this problem; however, by nature of the questions asked some information was obtained for the junior high level. No information was gathered concerning K-6 levels.

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<sup>21</sup>Tyrus Hillway, Introduction to Research, p. 189, The Riverside Press: Cambridge, Mass., 1956.

### Procedure

Two questionnaires were prepared for this study. The first questionnaire, appendix A, and a letter of explanation, appendix B, were mailed to the six heads of departments where industrial arts teacher training is offered in South Dakota. This survey was designed to determine what each college offers its prospective industrial arts teachers. The second questionnaire, appendix C, and a letter of explanation, appendix D, were mailed to 154 industrial arts instructors representing 132 South Dakota public secondary schools. This survey was designed to obtain information dealing with existing industrial arts programs and adequacy of teacher preparation. The first mailing was followed by a second letter sent two weeks later. A month after the first mailing a letter and another copy of the questionnaire were sent to all those from whom no reply had been received.

Data gathered by the above described procedures are reported in this study through the use of tables, appendices, and interpretative information.

## CHAPTER II

## REVIEW OF LITERATURE

Literature concerning industrial arts was reviewed to obtain background information for this study. Notations have been made concerning other research workers' findings in the area of industrial arts and are herein presented as follows: 1) secondary school industrial arts curriculum content, 2) industrial arts teacher requirements, 3) industrial arts teacher training curriculum, and 4) other problems related to industrial arts. Findings reported have been confined mostly to work conducted within the past 15 years.

## Secondary School Industrial Arts Curriculum Content

In Industrial Arts: Its Interpretation in American Schools is found this quotation in support of broadened industrial arts curriculum:

To confine one's efforts to a narrow field of materials is out of step with the rapidly expanding field of industrial materials in use at the present time. Furthermore, the media of industrial arts should not be confined to materials. Consideration must also be given to the tools and machines by which materials are modified, and the power by which these machines are operated.<sup>22</sup>

Schmitt<sup>23</sup> outlines curriculum trends in industrial arts during

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<sup>22</sup>Industrial Arts: Its Interpretation in American Schools, op. cit., p. 45.

<sup>23</sup>Marshall L. Schmitt, "Discernible Trends in Industrial Arts for the Past Half Century", Industrial Arts and Vocational Education, vol. 47, 142, Bruce Publishing Co.: Milwaukee, Wisconsin, May, 1958.

the past fifty years in his article, "Discernible Trends in Industrial Arts for the Past Half Century". At the turn of the century mechanical drawing and woodworking made up the manual training curriculum. Around 1924 wood, drawing, leather, general metals, art metal, craft work, and electricity were the leading areas of industrial arts study. About 1930 auto mechanics, graphic arts, and blueprint reading were added. After World War II construction, power, transportation, and communication were suggested<sup>24</sup> as additions.

Galer<sup>25</sup> in a South Dakota study of industrial arts courses offered from 1941-1948, found woodworking to be the most commonly offered course. This was followed by general shop, which he does not define. Mechanical drawing was in third position. Galer also notes in his thesis that less than one-half of the high schools offered industrial arts during the period 1941-1948.

The American Vocational Association<sup>26</sup> in 1953 suggested the following list of industrial arts areas as a complete curriculum:

1. Drawing and planning
2. Woodworking
3. Metalworking
4. Electricity and radio

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<sup>24</sup>William E. Warner, et al., "The New Industrial Arts Curriculum", p. 2, Unpublished Report, Ohio State University, Columbus, Ohio, 1947, quoted in Schmitt, loc. cit.

<sup>25</sup>Ralph F. Galer, "A Survey of Industrial Arts Courses in the Public Secondary Schools of South Dakota", p. 13, Unpublished Master's Thesis, University of South Dakota: Vermillion, S. Dak., June, 1948.

<sup>26</sup>"A Guide to Improving Instruction in Industrial Arts", A Revision of Standards of Attainment in Industrial Arts and Improving Instruction in Industrial Arts, p. 18, quoted in Schmitt, loc. cit.



5. Graphic arts
6. Transportation and power
7. Plastics
8. Leatherwork
9. Ceramics
10. Textiles
11. Home mechanics

The trend toward broader industrial arts offerings is borne out further in the program outlined by the Wisconsin Cooperative Educational Planning Program as seen in Table I. In this outline the program goes beyond one or two levels, and beyond just drawing and/or woodworking.

In 1956 a study was conducted in northern New Jersey by Ditlow,<sup>27</sup> who found that over 75 per cent of the industrial arts class time was spent in wood, drawing, and metal areas. In 1958 Cain,<sup>28</sup> who conducted a similar study in Kansas found drafting, metalwork, and woodwork predominating the industrial arts program at the various grade levels.

#### Industrial Arts Teacher Requirements

Cain<sup>29</sup> in his study found wide variations in the preparation of the teachers both in scope and in number of hours of credit in the various areas of industrial arts.

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<sup>27</sup>George H. Ditlow, "The Comprehensive Industrial Arts Laboratory in the Preparation of Industrial Arts Teachers for the Public Schools", New York University: New York, N. Y., 1956, Dissertation Abstracts, vol. XVII, no. 4, 813, University Microfilms, Inc.: Ann Arbor, Michigan, 1957.

<sup>28</sup>Cecil R. Cain, "An Analysis of the Industrial Arts Teaching Position and Teacher Preparation", Indiana University: Bloomington, Ind., Dissertation Abstracts, vol. XIX, no. 9, p. 2268, University Microfilms, Inc.: Ann Arbor, Michigan, 1959.

<sup>29</sup>Ibid.

Callan<sup>30</sup> in studying industrial arts teacher training institutions having the honor society for industrial arts, Epsilon Pi Tau, found that the 37 schools answering required an average of 40.7 semester hours in special industrial arts courses for a major. Table II shows where these colleges placed their emphasis.

TABLE II. INDUSTRIAL ARTS PROGRAMS OF 37 COLLEGES STUDIED BY CALLAN<sup>31</sup>

Area	Required subject	%	Elective subject	%	No offering	%
Automotive	11	30	8	21	18	49
Drawing	33	90	2	5	2	5
Electricity	29	78	4	11	4	11
Graphic Arts	20	54	4	11	13	35
Mechanics	5	13	2	5	30	82
Metals	30	81	6	16	1	3
Woods	31	84	5	13	1	3
Crafts	3	8	12	32	22	60

<sup>30</sup>Louis J. Callan, "Industrial Arts Teacher Education Programs: A Comparative Analysis and Evaluation of Selected Teachers and Colleges", The Ohio State University: Columbus, Ohio, 1952, Dissertation Abstracts, vol. XVII, 2515-2518, University Microfilms, Inc.: Ann Arbor, Michigan, 1957.

<sup>31</sup>Ibid., p. 2516.

Jarvis<sup>32</sup> conducted a study which brought results very similar to Callan's findings. Jarvis concluded from ten different individual studies that an industrial arts teacher must have at least 40 semester credits in drawing and shop courses for a major in industrial arts.

South Dakota Secondary School Standards,<sup>33</sup> specifically states that, "all teachers in accredited schools should teach only in those fields in which they have adequate preparation". This handbook of standards indicates that the teacher must have at least 15 semester hours of industrial arts which must include at least five semester hours in the specific subject area taught.

#### Industrial Arts Teacher Training Curriculum

Callan,<sup>34</sup> in using 140 returns, found that 89% of the total industrial arts program took place in the areas of woodworking, general shop, drawing, electricity, graphic arts, and driver's education. He felt that the subject matter area was too narrow and that there was widespread neglect in transportation, general shop, ceramics, elementary industrial arts, driver's education, handicrafts, and textiles. Callan concluded that the teachers felt that they had been inadequately prepared; they especially felt that the technical preparation had been

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<sup>32</sup>J. A. Jarvis, "College Industrial Arts Curriculum", Industrial Arts and Vocational Education, vol. 44, 184-185, Bruce Publishing Co.: Milwaukee, Wisconsin, June, 1955.

<sup>33</sup>Secondary School Standards, Bulletin no. 21B, pp. 13-14, Department of Public Instruction: Pierre, South Dakota, 1954.

<sup>34</sup>Callan, loc. cit.

incomplete, and that the student teaching had been particularly faulty.

During the fall of 1955, while visiting thirty colleges and universities across the United States, Miller<sup>35</sup> noted that there were very few teacher training institutions attempting to prepare industrial arts teachers in limited shops where only woodworking, drawing, and metals were offered. He found a sharp increase in laboratories for electricity, printing, auto mechanics, and craft work in jewelry, leather, and textiles.

Beeler<sup>36</sup> has the following to say about industrial arts teacher training: "...it is evident that unless a teacher has a specific training to handle industrial arts work, he fails to appreciate some of the finer points and is not capable of giving to the pupils the greatest training and co-ordination with their other subjects".

Industrial Arts: Its Interpretation in American Schools, encourages the industrial arts teacher to have a liberal general education and to meet standards equal with those required in other areas of the school curriculum, as well as pronounced competency in at least one craft trade along with the technical background for this trade. The bulletin states further qualifications:

The industrial arts teacher needs to be not only a highly trained professional person but also a good mechanic, an artisan,

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<sup>35</sup>H. J. Miller, "Visible Progress in Teacher Education", Industrial Arts and Vocational Education, vol. 46, 312-314, Bruce Publishing Co.: Milwaukee, Wisconsin, May, 1958.

<sup>36</sup>Samuel C. Beeler, "Content and Scope of Industrial Arts in Independent Schools", Industrial Arts and Vocational Education, vol. 47, 38A, Bruce Publishing Co.: Milwaukee, Wisconsin, May, 1958.

and a craftsman. In addition to the craft skills he must bring to the high school organization the same college training and the same breadth of view in regard to the social, economic, and political conditions (welfare) of the community as his more academically trained associates on the high school staff. The social viewpoint is so significant in the industrial arts teacher that his attitude toward pupils is commonly much more human and more understanding than those who deal with less concrete situations. He is much beloved by his pupils because of these qualities.<sup>37</sup>

#### Other Problems Related to Industrial Arts

The industrial arts graduates from Stout during the years 1946-1949 were studied by Bauers.<sup>38</sup> Of the 136 returning the questionnaire 14.8% taught at least one class in science, 11.8% taught at least one class in mathematics, and 7% taught at least one class in social science.

Of the 164 teachers polled in Kansas, 71 according to Cain,<sup>39</sup> had assumed instructional responsibilities in subject matter fields for which they lacked the minimum subject preparation.

Greaves<sup>40</sup> mentions the "problem student" or the student of low academic ability in relation to industrial arts: "So, with the approval of the principal (and he usually approves), 'Let's send them to that new

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<sup>37</sup>Industrial Arts: Its Interpretation in American Schools, op. cit. pp. 69, 72.

<sup>38</sup>Ronal R. Bauers, "A Follow-up Study of the Industrial Education Graduates Receiving the Bachelor of Science Degree from The Stout Institute During the Years 1946 to 1949", Unpublished Master's Thesis, The Stout Institute: Menomonie, Wisconsin, 1950.

<sup>39</sup>Cain, loc. cit.

<sup>40</sup>E. St. Pierre Greaves, "So You Want to be an Industrial Arts Teacher", Industrial Arts and Vocational Education, vol. 47, 234, Bruce Publishing Co.: Milwaukee, Wisconsin, October, 1958.

shop man'. Theme: 'Dump your burdens on that shop man and leave them there.'" In terms of the shop being a "dumping ground", Industrial Arts: Its Interpretation in American Schools states:

Another factor affecting the standing of industrial arts in the high school program is the practice of administrators in assigning the socially ill-adapted to the school shop. There is evidence that the industrial arts program is adapted to the needs of many of these maladjusted boys. However, there is danger that the presence of too many of the maladjusted pupils in the shop may create a bad impression among the more discerning and brighter pupils.<sup>41</sup>

Bakamis,<sup>42</sup> in an article, "New Look at Industrial Arts", says, "educationally speaking, there is a hierarchy of difficulty in industrial arts, as in other subject matter areas, which ranges from the simple to the infinitely complex." He goes on to say that it is possible to adapt industrial arts work to all levels from kindergarten through adult life. Gerbracht and Gilbert<sup>43</sup> see a recent accelerated growth in industrial arts at the kindergarten through sixth grade levels.

Industrial arts is often considered only for boys. When defining industrial arts it is considered a part of general education. Industrial Arts: Its Interpretation in American Schools states the following regarding the above two statements:

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<sup>41</sup>Industrial Arts: Its Interpretation in American Schools, op. cit. p. 65.

<sup>42</sup>W. A. Bakamis, "New Look at Industrial Arts", School Art, p. 16, Davis Publications, Inc.: Worcester, Mass., January, 1959.

<sup>43</sup>Carl Gerbracht, and Harold Gilbert, "Industrial Arts for Grades K-6", Industrial Arts and Vocational Education, vol. 47, 199-201, Bruce Publishing Co.: Milwaukee, Wisconsin, September, 1958.

In view of these facts and the assumption that industrial arts...is for general education purposes and not for specific training for a definite occupation, many of the limitations imposed by present practices upon the participation of girls in industrial arts work are without logical foundation. Experience shows that many girls do not confine their manipulative activities and their interests in the study of industrial products and services to things of the home, but are eager to express themselves through a variety of material media included in industrial arts work. In this connection it is also to be pointed out that pupil outcomes derived from industrial arts work, though it is offered as a part of the general education program, may have for some pupils propaedeutic values for vocational work. It is quite probable that girls as well as boys may find in industrial arts courses the beginning of a permanent vocational interest and that the work will serve as a foundation upon which to build future vocational training.<sup>44</sup>

#### Summary

Various studies indicate that woodworking and drawing predominate in the majority of industrial arts programs on the secondary school level. The trend in teacher training programs is toward a more inclusive industrial arts offering. Industrial arts teachers must meet standards equal with those in other areas of teaching. The various institutions differ concerning the number of industrial arts credit hours that should be required for teaching, but all agree that specific training is necessary if the teacher is to have sufficient knowledge and appreciation of the industrial arts area. The industrial arts teacher should have a liberal general background as well as profound competency in his field. Many industrial arts teachers are also teaching in one or more other subject matter areas. Industrial arts should

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<sup>44</sup>Industrial Arts: Its Interpretation in American Schools,  
op. cit. p. 48.

provide a challenge for many calibers of students, but it does not need to become a clearing house for problem students or for students having low academic ability.



## CHAPTER III

## PRESENTATION AND ANALYSIS OF DATA

Two questionnaires were prepared in order to obtain 1) information concerning the industrial arts courses being offered at the teacher training centers in South Dakota, and 2) information relating to the instructor's preparation and curriculum content in the public secondary schools of South Dakota.

Appendix A shows the questionnaire sent to the heads of the six industrial arts teacher training centers; appendix B contains the accompanying letter. This questionnaire was developed using suggested courses from Table I as well as other courses commonly offered on the college level. Other areas were added by the various heads of departments. This questionnaire was formed in order to learn what general and specific areas of industrial arts these institutions of higher learning are offering. The results obtained appear in Table III. As this table indicates, only the area of drawing was offered at all six institutions. The college reporting technical drawing offered it as three courses, so it is assumed that this is comparable to mechanical, machine, and architectural drawing as listed in the other schools. Woodworking was offered by five of the six schools. Three schools placed some emphasis on metals as well as on electricity. Little or no emphasis was being placed on the various other industrial arts areas.

The second questionnaire, appendix C, and a letter of explanation, appendix D, were sent to industrial arts instructors in the public sec-

TABLE III. INDUSTRIAL ARTS COURSES OFFERED IN SOUTH DAKOTA  
TEACHER TRAINING CENTERS

Course	Schools offering complete courses	Schools offering courses in combination with another course
Hand woodworking	5	0
Machine woodworking	5	0
Woodturning	5	0
Carpentry	2	0
Cabinetmaking	4	0
Patternmaking	2	1
Finishing	4	0
Upholstering	3	0
Bench metal	0	2
Art metal	1	1
Sheet metal	3	1
Machine shop	4	0
Forging	0	2
Welding	3	1
Foundry	0	3
General electricity	4	0
Radio	1	1
TV	0	0
Electronics	0	0
Auto mechanics	0	1
Auto body	0	0
Lapidary	0	1
Jewelry	1	1
Ceramics	1	0
Plastics	3	1
Leatherwork	2	1
Weaving	1*	1
Photography	1*	1
Presswork	1*	0
Linotype	1*	0
Block printing	0	1
Silk screen	0	1
Etching	0	1
Mechanical drawing	5	0
Machine drawing	4	0
Architectural drawing	4	0
Sketching	3	0
Pattern drawing	1	0
Design	2	0
Descriptive geometry	3	0

TABLE III. (Continued)

Course	Schools offering complete courses	Schools offering courses in combination with another course
Technical drawing	1	0
Crafts	1	0
Servising tools and machines	1	0
Shop organization and methods	1	0
Industrial arts in education	1	0
General metals	2	0
General shop	1	0
Power and transportation	1	0
Recreational crafts	1	0
Survey of industrial arts for recreation and education	1	0

\*Courses available but not actually a part of the industrial arts curriculum.

ondary schools of South Dakota. This questionnaire consisted of four parts. The first section concerned the industrial arts programs being offered throughout the state. The second part was designed to discover what specific areas of industrial arts were being covered at the secondary school level. The third division contained questions relating to the instructor's preparation and training in the field of industrial arts. An effort was also made to determine to what extent the instructor's college training had aided in his preparation for teaching the various industrial arts areas. A fourth part of the questionnaire was left for suggestions and comments.

The second questionnaire was mailed to 154 industrial arts instructors representing 132 South Dakota public secondary schools. The first mailing resulted in the return of 99 questionnaires, or 64.28 per cent of those sent. A second mailing brought 33 more replies, bringing the total to 132, or 85.71 per cent. A third mailing increased the responses by 13, bringing the final total to 145 replies, or 94.16 per cent. Five replies were disregarded as they did not directly concern secondary school industrial arts programs. The 140 returns represent 118 schools offering at least some area of industrial arts on the secondary level. These 118 schools comprise 45.74 per cent of the total 258 public secondary schools in South Dakota.

In presenting and analyzing the data, only the responses given for each question were used. Since not all 140 instructors or all 118 schools were represented in each question, a constant figure could not be used throughout the questionnaire.

Throughout the chapter a distinction is made between small and large schools. An arbitrary division was drawn at 500 students and 30 instructors. Thus in this study, eight secondary South Dakota schools are considered to be large schools.

The questions which were answered categorically either yes or no (questions 9, 11, 12, 14, and 15) were treated statistically using the chi-square test of significance<sup>45</sup> (Table IV). The equation used is as follows:

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<sup>45</sup>Henry E. Garrett, Statistics in Psychology and Education, pp. 253-254, Longmans, Green and Co.: New York, N. Y., 1958.

$$\text{chi-square} = \sum \left[ \frac{(f_o - f_e)^2}{f_e} \right]$$

in which  $f_o$  is the frequency of occurrence of observed answers in the study;  $f_e$  is the frequency of occurrence on some hypothesis. The hypothesis used was the chance hypothesis of 50 per cent yes and 50 per cent no. Yates<sup>46</sup> correction for continuity was used throughout. An example using the large school answers to question nine further explains the chi-square formula used:

	Yes	No	Total
Observed ( $f_o$ )	6	16	22
Expected ( $f_e$ )	11	11	22
$(f_o - f_e)$	5	5	
Correction ( $\cdot .5$ )	4.5	4.5	
$(f_o - f_e)^2$	20.25	20.25	
$\frac{(f_o - f_e)^2}{f_e}$	1.84	1.84	

Chi-square = 3.68 (sum of quotients)

Degrees of freedom = 1

Probability (P) =  $0.10 > P > 0.05$  as found in the Chi-square Table.<sup>47</sup>

A probability of  $.10 > P > .05$  means that the findings are significant at the 10 per cent, but not at the five per cent, level.

The first part of the questionnaire dealt with the industrial arts programs in the 118 schools. The findings for questions one, two,

<sup>46</sup>Ibid., p. 258.

<sup>47</sup>Ibid., p. 450 (Table E).

TABLE IV. RESPONSES TO QUESTIONS TREATED STATISTICALLY  
USING CHI-SQUARE FORMULA

Question number	Question	Large schools			
		Yes	No	Chi-sq.	Probability
9	Do you teach other subjects in addition to industrial arts?	7	16	3.68	.10 > P > .05
11	Do you have adequate shop space?	7	13	1.25	.30 > P > .20
12	Do you consider your shop to be adequately equipped for your present program?	12	8	.44	.70 > P > .50
14	Are students who lack academic ability encouraged to enroll in your industrial arts courses?	17	3	8.44	.01 > P
15	Do you feel there is a need for a state industrial arts guide?	17	0	15.06	.01 > P
				Small schools	
		Yes	No	Chi-sq.	Probability
9	Do you teach other subjects in addition to industrial arts?	98	17	55.66	.01 > P
11	Do you have adequate shop space?	49	69	3.06	.01 > P > .05
12	Do you consider your shop to be adequately equipped for your present program?	40	79	12.14	.01 > P
14	Are students who lack academic ability encouraged to enroll in your industrial arts courses?	59	58	0.00	0
15	Do you feel there is a need for a state industrial arts guide?	80	11	50.82	.01 > P

TABLE IV. (Continued)

Question number	Question	Total schools			
		Yes	No	Chi-sq.	Probability
9	Do you teach other subjects in addition to industrial arts?	104	33	32.06	.01 > P
11	Do you have adequate shop space?	56	82	4.52	.05 > P > .02
12	Do you consider your shop to be adequately equipped for your present program?	52	87	8.32	.01 > P
14	Are students who lack academic ability encouraged to enroll in your industrial arts courses?	76	61	1.44	.30 > P > .20
15	Do you feel there is a need for a state industrial arts guide?	97	11	66.90	.01 > P

and five are not recorded in this chapter as it was felt the questions were too general in nature.

The third question asked in what grades industrial arts courses were offered. The greatest emphasis on industrial arts appeared at the ninth and tenth grade levels in South Dakota secondary public schools (Table V). It can be seen that little was offered on the seventh and eighth grade levels.

A place was provided in the questionnaire for additional suggestions or comments. Two comments which deal with industrial arts grade placement were as follows: "Industrial arts should be required in junior high." "I feel industrial arts belongs in junior high, and senior high should be more vocational."

TABLE V. SCHOOLS OFFERING INDUSTRIAL ARTS AT THE VARIOUS GRADE LEVELS

Grade level	Large schools	Small schools	Total schools	Per cent
7	6	10	16	13.56
8	7	13	20	16.93
9	7	94	101	85.59
10	7	90	97	82.20
11	7	62	69	58.47
12	7	63	70	59.32

Industrial arts is defined as a part of general education. Yet when asked in the fourth question whether the industrial arts program in each school was only for boys, or only for girls, or for both boys and girls, 85.37 per cent of the instructors reported programs only for boys. No class was reported for girls only. The remaining 14.63 per cent indicated their programs were for either boys or girls; however, of these only ten instructors claimed to have girls enrolled in their programs.

The sixth question concerned class enrollment in industrial arts. The returns were not recorded by grade level but by total number of classes and the results appear in Table VI. Nearly 50 per cent of the industrial arts classes contained ten or fewer pupils.

The responses to the question concerning length of the class period varied among the schools. The returns were recorded by total number under the following headings: 40-45 minutes, 45-50 minutes,



TABLE VI. CLASS SIZE IN SOUTH DAKOTA PUBLIC SECONDARY SCHOOL  
INDUSTRIAL ARTS PROGRAMS

Size	Large school classes	Per cent	Small school classes	Per cent	Total classes	Total per cent
1 - 10	0	0.00	175	56.63	175	47.43
10 - 15	5	8.33	65	21.04	70	18.97
15 - 20	10	16.67	33	10.68	43	11.65
20 or more	45	75.00	36	11.65	81	21.95

50-55 minutes, 55-60 minutes, and double period. The majority of the instructors conducted a 55-60 minute period. Some schools held different length periods in the morning and afternoon, thus 148 different reports. Of these reports, 42.57 per cent indicated periods of 55-60 minutes. The 50-55 minute period was next with 23.65 per cent. The 45-50 minute period was reported by 10.81 per cent, while the 40-45 minute period was reported by 13.51 per cent. A double period was reported by 9.46 per cent.

When asked in question eight how many times the class met each week, 92.37 per cent of the instructors reported holding their classes five times a week. The remainder were held one, two, or three times a week.

Do you teach other subjects in addition to industrial arts? The statistical analysis of the results of this, the ninth question, appears in Table IV. It was found that the majority of the industrial arts instructors taught in another area or areas. In the large schools

7, or 27.27 per cent, of the instructors indicated they taught in other areas, while 16, or 72.73 per cent, indicated teaching only industrial arts. This showed significance at the 0.10 level but not at the 0.05 level. In the smaller schools 98, or 85.22 per cent, of the instructors taught other subjects, while 17, or 14.78 per cent, did not. Upon totaling all instructors 104, or 75.91 per cent, were teaching in an area(s) besides industrial arts. This indicates significance at the 0.01 level.

The instructors were asked to report in which areas they taught besides industrial arts. The results are found in Table VII. The areas of science, physical education, history, and mathematics were most commonly combined with industrial arts. Of the instructors working in other areas, 41.35 per cent taught in one area besides industrial arts, 38.46 per cent taught in two additional areas, 14.42 per cent in three additional areas, and 4.81 per cent in four other areas. One instructor reported teaching in five areas besides industrial arts.

When asked in question eleven, whether their shop space was adequate 56, or 40.58 per cent, of the instructors reported that they had adequate space, while the remaining 82, or 59.42 per cent, reported inadequate space; this indicated significance at the 0.05 level as shown in Table IV. Upon further analysis it was noted that 7, or 35.00 per cent, of the instructors from larger schools indicated adequate space, while 13, or 65.00 per cent, reported inadequate space; this was not significant at the 0.05 level. In the smaller schools 49, or 41.53 per cent, of the instructors replied that they had adequate space, while

TABLE VII. OTHER AREAS TAUGHT BY INDUSTRIAL ARTS INSTRUCTORS

Area	Number	Per cent
English	3	2.80
History	28	26.17
Science	31	28.97
Math	27	25.23
Music	2	1.88
Drivers Education	17	15.89
Physical Education	29	27.10
Vocational Education	9	8.41
Business Education	12	11.21
Other	38	35.51

69, or 58.47 per cent, reported inadequate space. This was significant at the 0.10 level. Table IV shows a complete statistical analysis of these responses.

Question twelve asked whether the shop was adequately equipped for the instructor's present program. Of the instructors reporting 52, or 37.41 per cent, thought their present shop was adequately equipped for their program. This was significant at the 0.01 level. Twelve, or 60.00 per cent, of the instructors in large schools indicated adequate equipment; this was not significant at the 0.05 level. In the smaller schools 40, or 33.61 per cent, of the instructors reported adequate equipment; this was significant at the 0.01 level (Table IV).

In order to expand their present programs, the instructors mentioned, in answer to question thirteen, several needs which must be met (Table VIII). Space and additional equipment were the most important needs.

TABLE VIII. NEEDS FOR EXPANSION OF INDUSTRIAL ARTS PROGRAMS

Needs	Large schools	Small schools	Total	Total per cent
Space	16	79	95	67.86
Equipment	15	93	108	77.14
Funds	12	70	82	58.57
Staff	9	19	28	20.00
Reorganization	0	30	30	21.43

In question fourteen the instructors were asked whether students who lacked academic ability were encouraged to enroll in industrial arts courses. Table IV gives the statistical analysis of the results. The instructors in the larger schools indicated that students lacking academic ability were encouraged to enroll in their courses. Seventeen out of 20, or 85.00 per cent, indicated this, which is significant at the 0.01 level. No significant differences were found in the total group or in the smaller school group. Two comments from the questionnaires show some feeling in this area: "We have training (in industrial arts) to fit the needs of all students. I will not turn any student down. But I will not let it be a dumping ground." "Poor students are en-

couraged by the principal to take industrial arts."

The fifteenth question asked whether the instructor felt a need for a state industrial arts guide. All answers were significant at the 0.01 level. In the smaller schools 80, or 87.91 per cent, favored a state guide; 17, or 100.00 per cent, of the large school instructors saw a need for this, bringing the total to 97, or 89.81 per cent (Table IV).

Following is a list of comments concerning industrial arts that were expressed by various instructors:

1. Any school starting industrial arts should meet certain requirements before credit should be offered.
2. Industrial arts is a very valuable course in our schools. It was started by a superintendent--two other superintendents taught it following--since then the department has not had the budget, appropriations, or space needed. Moral: If you want a good department, sell the superintendent!
3. Many schools try to operate a successful shop program with outdated equipment. The state department should make compulsory certain power tools such as the following:
  - Circular saw
  - Band saw
  - Sander (electric)
  - Planner or jointer
  - Adequate vises
  - Electric grinder--buffer
4. It is my contention that much improvement would come in woodworking areas if all students intending to follow such courses would have as a prerequisite, a minimum of one semester of drawing in a formal situation. By formal, I mean a regular classroom equipped for that expressed purpose.
5. I don't believe a school district should have industrial arts without a qualified instructor and good equipment.

The second part of the questionnaire concerned industrial arts subject areas covered by our South Dakota secondary school industrial

arts departments. A breakdown was requested for each area by grade level beginning with the seventh grade.

When general areas were considered, 21 of the 118 schools reporting, or 17.80 per cent, offered woodworking only. Three, or 2.54 per cent offered only drawing. Sixty-four schools offered industrial arts work only in the general areas of drawing and/or woodworking. These 64 schools represent 54.24 per cent of the schools offering industrial arts.

Table IX indicates the number of schools offering work in the various industrial arts areas. The seven specific areas included by the largest number of schools fall within the general areas of woodworking and drawing. The grade placement of the various areas is indicated in Table X. (In Table X: L = large schools; S = small schools; T = total schools).

The third part of the questionnaire concerned the preparation of the industrial arts instructors. The instructors were asked to check several items relating to their preparation for teaching. They were asked to indicate whether they had an industrial arts major or minor, the number of years of college, and whether they graduated from a South Dakota institution. Of the instructors in the large schools, 95.00 per cent had majored in industrial arts. Five per cent, or one individual, reported neither a major nor minor in this field. The reports of the instructors in the small schools indicated 52.99 per cent had majors in industrial arts, 22.22 per cent had minors, and 24.74 per cent had neither a major nor a minor. When the two school groups were combined, 59.12 per cent of the instructors reported an industrial arts major, 18.98 per

TABLE IX. THE NUMBER OF SOUTH DAKOTA SECONDARY SCHOOLS OFFERING WORK  
IN VARIOUS SUBJECT AREAS OF INDUSTRIAL ARTS

Subject area	Number of schools	Per cent
Hand woodworking	118	100.00
Machine woodworking	102	86.44
Wood turning	91	77.12
Carpentry	57	48.31
Cabinetmaking	71	60.17
Bench metal	16	13.56
Sheet metal	16	13.56
Art metal	10	8.47
Machine shop	12	10.17
Forging	11	9.32
Gas welding	21	17.80
Electric welding	28	23.73
General electricity	18	15.25
Radio	4	3.39
TV	3	2.54
Home mechanics	13	11.02
Auto mechanics	13	11.02
Auto body	4	3.39
Plastics	19	16.10
Leather work	22	18.64
Ceramics	6	5.08
Jewelry	4	3.39
Lapidary	2	1.69
Photography	7	5.93
Printing	6	5.08
Mechanical drawing	96	81.36
Machine drawing	28	23.73
Architectural drawing	37	31.36
Pattern drawing	25	21.19
Other	10	8.47

TABLE X. THE NUMBER OF SOUTH DAKOTA SECONDARY SCHOOLS OFFERING WORK IN VARIOUS SUBJECT AREAS OF INDUSTRIAL ARTS AT EACH GRADE LEVEL

Subject area	7th			8th			9th			10th			11th			12th		
	L	S	T	L	S	T	L	S	T	L	S	T	L	S	T	L	S	T
Hand woodworking	3	11	14	6	14	20	8	93	101	5	60	65	4	40	44	4	32	36
Machine woodworking	0	2	2	1	3	4	3	48	51	5	60	65	5	38	43	5	44	49
Wood turning	2	3	5	2	3	5	5	50	55	5	55	60	5	37	42	5	31	36
Carpentry	1	1	2	1	1	2	1	23	24	2	30	32	2	22	24	2	25	27
Cabinetmaking	1	1	2	1	1	2	2	23	25	4	33	37	5	31	36	5	33	38
Bench metal	3	0	3	1	0	1	1	4	5	4	6	10	6	4	10	7	3	10
Sheet metal	3	0	3	2	0	2	3	4	7	4	4	8	6	1	7	6	3	9
Art metal	2	2	4	1	4	5	1	4	5	2	2	4	3	2	5	3	3	6
Machine shop	1	0	1	1	0	1	1	2	3	3	1	4	6	4	10	6	3	9
Forging	1	0	1	1	0	1	1	3	4	2	2	4	3	4	7	2	5	7
Gas welding	0	0	0	0	0	0	0	6	6	4	7	11	6	9	15	6	8	14
Electric welding	0	0	0	0	0	0	0	12	12	3	11	14	5	13	18	6	11	17
General electricity	2	2	4	4	3	7	3	7	10	0	6	6	0	3	3	1	5	6
Radio	0	0	0	0	0	0	0	2	2	1	1	2	1	0	1	2	3	5
TV	0	0	0	0	0	0	0	1	1	1	0	1	1	0	1	2	2	4
Home mechanics	2	1	3	1	0	1	2	6	8	0	4	4	0	4	4	0	4	4
Auto mechanics	0	0	0	0	0	0	0	2	2	2	1	3	3	3	6	5	5	10
Auto body	0	0	0	0	0	0	0	2	2	0	1	1	1	1	2	1	2	3
Plastics	2	5	7	3	6	9	1	10	11	2	3	5	3	6	9	2	6	8
Leather work	1	5	6	2	6	8	1	14	15	0	10	10	0	8	8	0	8	8
Ceramics	1	1	2	0	0	0	0	4	4	0	1	1	0	3	3	0	1	1
Jewelry	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	1	1
Lapidary	0	0	0	0	0	0	0	1	1	0	0	0	0	1	1	0	0	0
Photography	0	0	0	0	0	0	0	3	3	0	3	3	0	2	2	0	3	3
Printing	0	0	0	0	0	0	0	3	3	2	2	4	2	0	2	1	1	2
Mechanical drawing	3	4	7	4	5	9	6	64	70	7	48	55	7	30	37	7	31	38
Machine drawing	1	0	1	1	0	1	2	10	12	5	9	14	5	12	17	5	11	16
Architectural drawing	1	0	1	1	0	1	1	7	8	5	13	18	6	13	19	5	16	21
Pattern drawing	1	1	2	1	0	1	1	11	12	1	10	11	2	4	6	2	8	10



cent a minor, and 21.90 per cent indicated neither a minor nor a major.

Table XI shows the amount of education attained by the industrial arts instructors. A Bachelor of Science Degree was held by 45.97 per cent, 20.16 per cent indicated work beyond the Bachelor of Science Degree, and 20.97 per cent held a Master of Science Degree.

TABLE XI. AMOUNT OF TRAINING ATTAINED BY INDUSTRIAL ARTS INSTRUCTORS

College training	Large school instructors	Small school instructors	Total	Total per cent
Less than 4 years	1	6	7	5.65
Bachelor of Science Degree	8	49	57	45.97
Beyond Bachelor of Science Degree	3	22	25	20.16
Master of Science Degree	4	22	26	20.97
Beyond Master of Science Degree	4	5	9	7.26

The largest per cent of our industrial arts instructors have been trained in South Dakota teacher training centers. Eight instructors in the large schools graduated in South Dakota while 11 graduated outside of South Dakota. In the small schools 80 graduated in South Dakota and 26 received their education outside the state. Of the total, 70.40 per cent of the industrial arts instructors graduated from South Dakota schools.

The instructors were asked to indicate the number of industrial arts courses they had taken. These course hours are listed under the

headings: less than 12 hours, 13-23 hours, 24-35 hours, and 36 or more hours (Table XII). Table XII shows that 90.00 per cent of the large school instructors were qualified instructors according to South Dakota standards.<sup>48</sup> It was difficult to tell whether or not the group with 13-23 credit hours was qualified; hence they were not included as qualified. In the small school group, 64.34 per cent of the instructors were qualified. When both groups were totaled, 68.15 per cent of the South Dakota industrial arts instructors were qualified according to South Dakota standards.

TABLE XII. CREDIT HOURS OF INDUSTRIAL ARTS WORK TAKEN BY INDUSTRIAL ARTS INSTRUCTORS

Credit hours	Large school instructors	Per cent	Small school instructors	Per cent	Total	Total per cent
Less than 12*	0	0.00	21	18.26	21	15.55
13-23*	1	5.00	15	13.04	16	11.85
24-35*	0	0.00	12	10.43	12	8.89
36 or more*	12	60.00	50	43.48	62	45.93
Less than 12**	1	5.00	3	2.60	4	2.96
13-23**	0	0.00	2	1.74	2	1.48
24-35**	0	0.00	2	1.74	2	1.48
36 or more**	6	30.00	10	8.69	16	11.85

\*Quarter hours.

\*\*Semester hours.

<sup>48</sup>Industrial arts instructors must have 15 semester hours of industrial arts work to be qualified according to South Dakota standards. See footnote 33.

The instructors were asked how many years they had taught within South Dakota as well as in other states. Table XIII gives the results of the number of years taught within South Dakota.

TABLE XIII. THE NUMBER OF YEARS SOUTH DAKOTA INDUSTRIAL ARTS INSTRUCTORS HAVE TAUGHT IN SOUTH DAKOTA

No. years	Large school instructors	Small school instructors	Total	Per cent
1	2	19	21	15.11
2	2	16	18	12.95
3	0	12	12	8.63
4	0	7	7	5.04
5	1	6	7	4.32
Over 5	17	58	75	53.96

Table XIV indicates the number of years the industrial arts instructors have remained in their present teaching locations.

No specific breakdown was requested for those remaining in a system over five years and very few instructors volunteered this information; however, one instructor reported teaching in South Dakota systems 38 years.

The industrial arts instructors were given a list of general industrial arts areas and were asked to indicate where they received training in these areas. This list was checked to some degree by 134 instructors. The general areas which were most often learned in college

TABLE XIV. THE NUMBER OF YEARS INDUSTRIAL ARTS INSTRUCTORS HAVE TAUGHT IN PRESENT LOCATION

No. Years	Large school instructors	Small school instructors	Total	Per cent
1	2	27	29	21.32
2	1	28	29	21.32
3	4	16	20	14.71
4	1	6	7	5.15
5	0	6	6	4.41
Over 5	13	32	45	33.09

were woodworking, drawing, and metalworking. Mechanics was more often self-taught than any other area, and woodworking was more often learned through practical experience than any other area. More instructors indicated little or no training in graphic arts than in any of the other areas. Table XV shows where the South Dakota industrial arts instructors received their training in the various areas.

This same list of general areas was used for reporting the extent to which the instructors felt that their college training had prepared them for teaching in these areas (Table XVI). The greatest number of teachers felt they received more help from college in drawing and woodworking than in the other areas. A large per cent of the instructors felt they had received no help in electricity, graphic arts, and mechanics.

Some quotations from the questionnaires indicate feelings of the various instructors regarding their training:

TABLE XV. WHERE SOUTH DAKOTA INDUSTRIAL ARTS INSTRUCTORS RECEIVED THEIR TRAINING IN THE GENERAL INDUSTRIAL ARTS AREAS

General industrial arts areas	Learned in college		Self-taught		Practical experience		Other		Little or no training	
	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent
Drawing	111	82.84	15	11.19	25	18.66	12	8.96	2	1.49
Woodworking	116	86.57	32	23.88	52	38.81	13	9.70	1	0.75
Metalworking	91	67.57	11	8.21	24	17.91	6	4.48	9	6.72
Mechanics	36	25.37	40	29.85	28	20.90	4	2.99	18	13.43
Electricity	39	29.10	32	23.88	29	21.64	5	3.73	21	15.67
Crafts	57	42.54	17	12.69	8	5.97	1	0.75	22	16.42
Graphic arts	25	18.66	5	3.73	2	1.49	0	0.00	46	34.33

TABLE XVI. COLLEGE HELP RECEIVED IN THE VARIOUS AREAS BY INDUSTRIAL ARTS INSTRUCTORS

General industrial arts areas	Enough help in college		Some help		No help		Not important to stress	
	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent
Drawing	87	67.44	28	21.71	7	5.43	2	1.55
Woodworking	87	67.44	31	24.03	6	4.65	1	0.78
Metalworking	54	41.86	35	27.13	10	7.75	1	0.78
Mechanics	17	13.18	26	20.16	36	27.91	3	2.33
Electricity	21	16.28	29	22.48	37	28.68	1	0.78
Crafts	38	29.46	26	20.16	19	14.73	2	1.55
Graphic arts	14	10.85	15	11.63	40	31.01	6	4.65

1. Colleges lack such courses as job analysis or trade analysis.
2. Many college subjects are weak--even on the Master of Science level.
3. Colleges are poorly equipped.
4. I would like to see more training in college for teaching electricity, sheet metal, and auto mechanics.
5. A person cannot get enough courses in college that will make him a good shop teacher. He must have a background of different phases of mechanical arts and also an aptitude for mechanics.
6. My best information for teaching industrial arts was gained outside of college. The most practical and down to earth information is NOT taught in college.
7. South Dakota colleges do not offer a wide enough range in industrial arts subjects.
8. I believe all industrial arts students planning to teach should become proficient in the use of machines and tools used in high school shops even though this means practice exercises. One or two small projects on a lathe, shaper, jointer, or circle saw are not enough. Skill and not a prize-taking project should be the aim. Too many of our cadet teachers are not familiar enough with the use of tools and machines.
9. You can get some very good training in industry. This helps more than college.
10. I am not prepared to teach the class, but there was no one in school to teach it so I am taking it.
11. I have had more than 20 years in a business, building, and construction. This practical experience has helped a great deal in my present teaching. I feel that a period of two or three years actual experience in the field helps a great deal in teaching.
12. Our shop is part of a new addition which was opened after school started last fall. No industrial arts person had been hired and I am just filling in this year.
13. I am offering shop and mechanical drawing, not because I am qualified or because it is my field or work; but rather because I think many students need this work to prove to them-

selves that they can succeed in vocational fields even if their academic level is below average.

14. No shop training! Physical education major.
15. I am not a shop instructor--merely filled in so shop could be offered.

### Summary

The returns of the questionnaire sent to the six industrial arts teacher training centers in South Dakota reported information concerning the industrial arts courses offered to prospective industrial arts instructors. All six of the colleges included the area of drawing in their curriculum. Five colleges offered courses in the area of woodworking. Approximately half of the colleges included work in metals. Offerings in electricity were provided by four of the industrial arts training centers. The areas of graphic arts, crafts, and mechanics were virtually neglected.

The second questionnaire was mailed to 154 industrial arts instructors representing 132 South Dakota public secondary schools. This study concerns 140 replies representing 118 schools.

In analyzing the data all of the responding schools were treated as a group, and in order to make comparisons of results, they were also divided into large and small schools. Five hundred students and/or 30 teachers were used as an arbitrary division. The chi-square test of significance was used in analyzing the returns for questions answered in terms of yes and no.

This questionnaire consisted of four parts: the industrial arts



program of the school, specific areas of industrial arts covered at the secondary level, instructor's preparation and training, and a section for suggestions and comments.

The majority of industrial arts classes were offered at the ninth and tenth grade levels; very few classes were conducted for girls. Little emphasis was placed on industrial arts in the seventh and eighth grades. The majority of the classes were held five days a week for 55-60 minutes. Half of the industrial arts classes in South Dakota public secondary schools were held for 10 or fewer pupils.

When all the instructors were totaled, it was found that 76 per cent were teaching in other areas in addition to industrial arts. In the small schools 85 per cent taught in other areas; while in the large schools this was true of 27 per cent of the instructors. Of the instructors teaching in other areas, 41 per cent taught in one area besides industrial arts, 38 per cent taught in two, 14 per cent taught in three, 5 per cent taught in four, and one instructor reported teaching in five additional areas.

Approximately 60 per cent of the instructors reported inadequate space and equipment in their present shops.

In the small schools approximately 88 per cent of the instructors indicated a need for a state industrial arts guide, while 100 per cent of the instructors in the large schools felt this need.

Fifty-four per cent of the schools were found to offer only drawing and/or woodworking in their industrial arts programs. On the secondary level the general areas of drawing and woodworking received the

greatest emphasis. This situation also prevailed in the teacher training centers.

In the large schools 95 per cent of the industrial arts instructors majored in industrial arts, while in the small schools this was true of 53 per cent of the instructors. Twenty-five per cent of the small school industrial arts instructors reported neither a major nor a minor.

Seventy per cent of the industrial arts instructors reported graduating in South Dakota. Of the total, six per cent of the industrial arts instructors had less than four years of college training.

A majority of the industrial arts instructors have had over five years experience and approximately one-third of the instructors have remained in one place over five years.

The industrial arts instructors answering felt that the general areas of woodworking and drawing had been more thoroughly covered in college than the other industrial arts areas.

## CHAPTER IV

## SUMMARY, IMPLICATIONS, AND RECOMMENDATIONS

## Summary

The primary purpose of education is to train students for citizenship in a democracy. As a part of general education industrial arts acquaints the student with industry through experimentation, exploration, and manipulation of materials and processes used in everyday life.

As South Dakota moves from an agrarian to an industrial state, industrial arts should play a more prominent role. We are not meeting the needs of South Dakota students when less than half of the public secondary schools offer industrial arts.

The problem in this study was to gather information concerning the industrial arts programs presently being offered in South Dakota secondary public schools, and the training of the instructors in charge of these programs. It was felt that the study could make a contribution toward three major concerns:

1. A possible need for a greater number of industrial arts departments in our South Dakota secondary schools.
2. A need for expanding the industrial arts curricula in our secondary schools.
3. The extent to which our present teacher training programs are meeting the needs of our instructors.

The purpose of the study was to gather pertinent information regarding the following four items:

1. What is the content of the industrial arts programs offered in the secondary public schools of South Dakota?
2. What steps can be taken to encourage broader industrial arts offerings in our secondary schools?
3. What standards or qualifications do the industrial arts instructors of South Dakota possess?
4. In what areas of industrial arts do the secondary school instructors feel inadequately prepared?

The procedure involved the preparation of two questionnaires. The first was sent to the six industrial arts teacher training centers of South Dakota to determine what each college offered its prospective industrial arts instructors. The second was mailed to 154 industrial arts instructors representing 132 South Dakota public secondary schools offering industrial arts. This questionnaire was designed to obtain information concerning existing industrial arts programs and adequacy of teacher preparation.

In reviewing literature, information was obtained concerning industrial arts curriculum content on the secondary school and the college levels, secondary school teacher preparation, and current trends in industrial arts education. Woodworking and drawing predominate in the majority of industrial arts programs on the secondary level. The trend in teacher training programs is toward a more inclusive industrial arts offering. Credit hour requirements for teaching industrial arts vary considerably.

The returns from the six teacher training centers indicated that

woodworking and drawing were included in nearly all of their curricula. Metalworking was being offered to some extent but there was little emphasis on electricity, graphic arts, and mechanics.

When analyzing the returns from secondary schools, all of the responding schools were treated as a group, and in order to make comparisons of results they were also divided into large and small schools. Five hundred students and/or 30 instructors was used as an arbitrary division. The data used represent 140 instructors and 118 schools. All results were calculated in terms of percentage of total answers for each question. All percentages were rounded to two decimals; however, in the summaries whole numbers were used. All questions answered categorically yes or no were treated statistically using the chi-square test of significance.

The majority of industrial arts classes were offered at the ninth and tenth grade levels; little emphasis was placed on industrial arts in the seventh and eighth grades. Very few classes were offered for girls. Half of the industrial arts classes in South Dakota public secondary schools were held for ten or fewer pupils.

In the large schools nearly 75 per cent of the instructors taught only industrial arts, while in the small schools this was true of approximately 15 per cent only. Of the instructors who taught in other areas, half of them were teaching more than one area besides industrial arts.

To expand present programs, a majority of the instructors felt that space, equipment, and funds were necessary, while only 20 per cent

felt additional staff and reorganization would be required for expansion.

Over half of the schools offered work only in drawing and/or wood-working. This corresponds with the majority of our teacher training centers where heavy emphasis was also placed on these two areas. The industrial arts instructors indicated that their college training had adequately prepared them for teaching in the areas of drawing and wood-working and to a lesser degree in metals. However, they indicated inadequate preparation in the areas of graphic arts, crafts, electricity, and mechanics. An analysis of the data obtained from the industrial arts teacher training centers corresponds with these findings.

Seventy per cent of South Dakota industrial arts instructors held degrees from South Dakota institutions of higher learning. Ninety-five per cent of the large school industrial arts instructors had industrial arts majors. Nearly one-fifth of the total number of industrial arts instructors had neither a major nor a minor. Six per cent of the total number had less than four years training, while 30 per cent had at least a Master of Science Degree or a Master of Education Degree.

According to South Dakota requirements, 90 per cent of the large school instructors had a sufficient number of industrial arts credit hours to qualify them for teaching in their area; this was true with 68 per cent of the small school instructors.

A majority of the industrial arts instructors have had over five years experience and approximately one-third of the instructors have remained in one place over five years.

### Implications

With all six state supported colleges offering rather limited programs, it is not too surprising to find public secondary schools with limited offerings. Seventy per cent of the secondary school industrial arts instructors have graduated from our state schools. It would seem that the teacher training centers must take the lead in broadening their curricula; secondary school industrial arts instructors cannot be expected to offer areas which they are not prepared to teach. Some of the following questions must be answered before South Dakota college industrial arts curricula are expanded: Do we really need six schools training industrial arts instructors? Would it be better to combine present efforts and have fewer institutions doing a more thorough job? Do present and predicted future enrollments warrant six training centers? Which general and specific areas should be offered? What are other states offering in their industrial arts teacher training centers? What are other states' requirements for teaching industrial arts? Do South Dakota colleges need to offer training in industrial arts beyond the Bachelor of Science Degree?

With less than half of our South Dakota public secondary schools providing industrial arts, much should be done toward expanding our state offerings. Further study might be made to determine why the majority of secondary schools do not offer industrial arts. Would cost, size of school, lack of interest in industrial arts, space, lack of trained teachers, etc. be determining factors?

Class size is often considered to be one indication of the effectiveness of teaching. With 50 per cent of our classes containing 10 or fewer pupils, we might think an effective program was being conducted. Further study needs to be made to evaluate the results obtained in the small class versus the large class in South Dakota schools. Industrial arts in the small classroom, as well as in the large classroom, could well be "busy work" rather than a broad exploratory course as it should be. A study of industrial arts offerings in our secondary schools would be necessary before the effectiveness of our programs could be determined. Since the needs of the students and community vary from one locality to another, evaluation would not be an easy task.

When approximately 75 per cent of the industrial arts instructors are also teaching in other areas, they are splitting their interest. Are they trained for these varied interests? It is recognized that the large number of small schools can only exist by employing one instructor for several areas. Is this desirable? Further study might be made to see how well these 75 per cent are trained to meet these divided interests. Why are one-fourth of our industrial arts instructors offering work in this field when they have neither a major nor a minor in industrial arts? Ideally most educators would have instructors teaching only in their major fields. Might reorganization be a partial answer to this problem?

A broadened tax base, larger districts, and larger schools could be a solution for the 60 per cent of the industrial arts instructors who indicated inadequate space and equipment in their present location. A further study of space and equipment requirements would be valuable. A



state minimum standard for industrial arts departments would help this situation.

With 90 per cent of the instructors wanting a state guide, one can see a definite need for work in this direction. Further investigation needs to be conducted to determine what information a guide should contain. With state minimum suggestions as a guide, a better program might be offered in our secondary schools, although guides too often become state minimums and school maximums.

With over half of our secondary public schools offering just drawing and/or woodworking, it implies that the majority of our schools are not really offering an industrial arts program at all but rather a wood shop or a drawing course. The teacher training centers tend to follow this same pattern. A study could be made to compare program offerings of graduates from our six teacher training centers with programs offered by graduates from schools outside South Dakota. Do the instructors teach as they were taught? If industrial arts is to be offered to the fullest extent, then it would seem necessary to expand industrial arts offerings both on college and secondary school levels.

With 25 per cent of the industrial arts instructors having neither an industrial arts major nor minor, there are many unqualified industrial arts instructors in South Dakota. A further study should be made of these 25 per cent to see what background, if any, resulted in their employment as industrial arts instructors. Is it acceptable? Or are these instructors just "filling in for the year"? These observations would indicate that a qualified industrial arts instructor should have

no trouble obtaining employment.

With six per cent of the instructors having less than four years of college and 46 per cent having a Bachelor of Science Degree, further training might be needed or desired in industrial arts. This might be determined for future use by teacher training centers.

Seventy per cent of the industrial arts instructors graduated in South Dakota. Some answers to the following questions might help at this point: Why do they stay in South Dakota? Why don't more of our South Dakota trained instructors stay in South Dakota? What are the reasons the 30 per cent of out of state graduates are teaching industrial arts in South Dakota?

Since 32 per cent of our South Dakota instructors are unqualified according to our state standards, something should be done to improve this situation. Other reports would indicate South Dakota standards are very low. Further study would be desirable. Are the large schools, where 90 per cent of the instructors are qualified, doing a better job because of these qualified instructors?

Since one-third of our industrial arts instructors have remained in one place over five years, South Dakota industrial arts instructors seem to be a fairly stable group. What are the contributing factors? Is this true of other staff members in the same school? Is this unique with industrial arts?

#### **Recommendations**

The following recommendations are presented for the improvement

and expansion of industrial arts programs in South Dakota:

1. Existing industrial arts teacher qualifications should be enforced as well as increased to meet qualifications of other states.
2. With the great number of areas to cover in industrial arts, the industrial arts instructor should have a major in industrial arts before he is allowed to teach industrial arts.
3. After a careful study of present and future needs, as well as existing programs, is made, a state industrial arts guide should be compiled by South Dakota's leaders in industrial arts. A study of what other states are doing in this area should also be considered.
4. There should be fewer industrial arts teacher training centers in South Dakota so that broader curricula and expanded facilities might be possible.
5. Industrial arts at the eighth and ninth grade levels should be broad, general, and exploratory in nature. If possible, allow for specialization in an elected area at the tenth grade level; the eleventh and twelfth grades should be devoted to vocational subjects which were explored at the lower levels.
6. The industrial arts instructor should not be asked to teach in more than one, if any, additional areas.
7. School districts should be reorganized on a county basis, thus enabling schools to have better industrial arts programs as well as improved opportunities in other areas.
8. More emphasis must be placed in the areas of metalworking, mechanics, electricity, crafts, and graphic arts in teacher training centers as well as in the secondary schools.

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**APPENDIX**

## APPENDIX A

QUESTIONNAIRE SENT TO SOUTH DAKOTA INDUSTRIAL ARTS  
TEACHER TRAINING CENTERS

---

Please check the areas offered within your industrial arts curriculum for undergraduate credit and indicate the quarter hour credits allotted to each. If some areas are combined under one course heading please indicate. Also if you have additional areas not listed, please indicate.

CREDIT	COURSE	CREDIT	COURSE
—	Hand woodworking	—	Auto Body
—	Machine woodworking	—	Lapidary
—	Woodturning	—	Jewelry
—	Carpentry	—	Ceramics
—	Cabinetmaking	—	Plastics
—	Patternmaking	—	Leatherwork
—	Finishing	—	Weaving
—	Upholstering	—	Photography
—	Bench metal	—	Presswork
—	Art metal	—	Linotype
—	Sheet metal	—	Block printing
—	Machine shop	—	Silk screen
—	Forging	—	Etching
—	Welding	—	Mechanical drawing
—	Foundry	—	Machine drawing
—	General electricity	—	Architectural drawing
—	Radio	—	Sketching
—	TV	—	Pattern drawing
—	Electronics	—	Design
—	Auto mechanics	—	



## APPENDIX B

LETTER SENT TO SOUTH DAKOTA INDUSTRIAL ARTS  
TEACHER TRAINING CENTERS

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Dear Department Head:

At the present time I am working on a thesis for partial requirement toward a Master of Science in Education at South Dakota State College. I am making a study to learn what areas are being covered in industrial arts programs of our South Dakota public secondary schools. I am also concerned about the preparation of the instructors within these various areas. I hope to compare industrial arts teacher preparation and high school industrial arts offerings with offerings in the industrial arts teacher training departments in the state. This study, I hope, will help us evaluate our various teacher training programs and increase emphasis toward improved broader industrial arts offerings in South Dakota secondary schools.

Would you please help me with this study by completing the enclosed form and return it at your earliest convenience.

If you are interested in a summary of my thesis, I will be glad to send you a copy upon completion.

Thank you for your cooperation.

Yours truly,

Wayne L. Salmen

## APPENDIX C

**QUESTIONNAIRE SENT TO INDUSTRIAL ARTS INSTRUCTORS IN SOUTH DAKOTA  
SECONDARY PUBLIC SCHOOLS**

Name of your school \_\_\_\_\_

Total high school enrollment \_\_\_\_\_

Industrial arts instructor \_\_\_\_\_

**I. INDUSTRIAL ARTS PROGRAM**Check the answer that corresponds to your situation.   x  

1. In what type of community is your school located?  
Farming\_\_\_\_, Ranching\_\_\_\_, Mining\_\_\_\_, Industrial\_\_\_\_, Other\_\_\_\_.
2. What per cent of the industrial arts students come from rural areas?  
75-100\_\_\_\_, 50-75\_\_\_\_, 25-50\_\_\_\_, less than 25\_\_\_\_.
3. In what grades are industrial arts courses offered?  
7\_\_\_\_, 8\_\_\_\_, 9\_\_\_\_, 10\_\_\_\_, 11\_\_\_\_, 12\_\_\_\_.
4. Is the industrial arts program in your school only for boys?\_\_\_\_  
only for girls?\_\_\_\_ for both boys and girls?\_\_\_\_.
5. How many students do you have enrolled in some area of industrial arts in the following grades?  
Boys: 7\_\_\_\_, 8\_\_\_\_, 9\_\_\_\_, 10\_\_\_\_, 11\_\_\_\_, 12\_\_\_\_.  
Girls: 7\_\_\_\_, 8\_\_\_\_, 9\_\_\_\_, 10\_\_\_\_, 11\_\_\_\_, 12\_\_\_\_.
6. What is the class enrollment in industrial arts?  

	1-10	10-15	15-20	20 or more
Grade 7	—	—	—	—
Grade 8	—	—	—	—
Grade 9	—	—	—	—
Grade 10	—	—	—	—
Grade 11	—	—	—	—
Grade 12	—	—	—	—
7. What is the length of the class period?  

	40-45 Min.	45-50 Min.	50-55 Min.	55-60 Min.	Double
Grade 7	—	—	—	—	—
Grade 8	—	—	—	—	—
Grade 9	—	—	—	—	—
Grade 10	—	—	—	—	—
Grade 11	—	—	—	—	—
Grade 12	—	—	—	—	—
8. What is the number of class meetings each week?  

	1	2	3	4	5 +
Grade 7	—	—	—	—	—
Grade 8	—	—	—	—	—
Grade 9	—	—	—	—	—

- Grade 10    \_\_\_    \_\_\_    \_\_\_    \_\_\_    \_\_\_  
 Grade 11    \_\_\_    \_\_\_    \_\_\_    \_\_\_    \_\_\_  
 Grade 12    \_\_\_    \_\_\_    \_\_\_    \_\_\_    \_\_\_
9. Do you teach other subjects in addition to industrial arts?  
 Yes \_\_\_, No \_\_\_.
  10. If the answer is Yes x in question 9, check other courses taught: English \_\_\_, History \_\_\_, Science \_\_\_, Mathematics \_\_\_, Music \_\_\_, Drivers education \_\_\_, Physical education \_\_\_, Vocational agriculture \_\_\_, Business education \_\_\_, Other \_\_\_.
  11. Do you have adequate shop space? Yes \_\_\_, No \_\_\_.
  12. Do you consider your shop to be adequately equipped for your present program? Yes \_\_\_, No \_\_\_.
  13. To expand your present industrial arts program you would need: Additional space \_\_\_, Additional equipment \_\_\_, Additional funds \_\_\_, Additional staff \_\_\_, School district reorganization \_\_\_.
  14. Are students who lack academic ability encouraged to enroll in your industrial arts courses? Yes \_\_\_, No \_\_\_.
  15. Do you feel there is a need for a state industrial arts guide? Yes \_\_\_, No \_\_\_.

**II. INDUSTRIAL ARTS SUBJECT AREAS**

If you offer work in these areas check R if required, E if elective, and V if this area is covered in a vocational program by your school also.

	7	8	9	10	11	12
Hand woodworking	—	—	—	—	—	—
Machine woodworking	—	—	—	—	—	—
Wood turning	—	—	—	—	—	—
Carpentry	—	—	—	—	—	—
Cabinetmaking	—	—	—	—	—	—
Bench metal	—	—	—	—	—	—
Sheet metal	—	—	—	—	—	—
Art metal	—	—	—	—	—	—
Machine shop	—	—	—	—	—	—
Forging	—	—	—	—	—	—
Gas welding	—	—	—	—	—	—
Electric welding	—	—	—	—	—	—
General electricity	—	—	—	—	—	—
Radio	—	—	—	—	—	—
TV	—	—	—	—	—	—
Home mechanics	—	—	—	—	—	—
Auto mechanics	—	—	—	—	—	—
Auto body	—	—	—	—	—	—
Plastics	—	—	—	—	—	—
Leather work	—	—	—	—	—	—
Ceramics	—	—	—	—	—	—
Jewelry	—	—	—	—	—	—
Lapidary	—	—	—	—	—	—
Photography	—	—	—	—	—	—

Printing \_\_\_\_\_  
 Mechanical drawing \_\_\_\_\_  
 Machine drawing \_\_\_\_\_  
 Architectural drawing \_\_\_\_\_  
 Pattern drawing \_\_\_\_\_  
 Other \_\_\_\_\_  
 Other \_\_\_\_\_  
 Other \_\_\_\_\_

**III. INDUSTRIAL ARTS TRAINING**

Check items that apply in your preparation.   x  .

Industrial arts major \_\_\_\_\_, Industrial arts minor \_\_\_\_\_,  
 Less than four years college training \_\_\_\_\_, B.S. \_\_\_\_\_, Training beyond  
 B.S. \_\_\_\_\_, M.S. \_\_\_\_\_, Training beyond M.S. \_\_\_\_\_.  
 Graduated in South Dakota \_\_\_\_\_, Graduated outside South Dakota \_\_\_\_\_.  
 Industrial arts course hours: Less than 12 hours \_\_\_\_\_, 13-23  
 hours \_\_\_\_\_, 24-35 hours \_\_\_\_\_, 36 or more hours \_\_\_\_\_.  
 The above are figured in: Quarter hours \_\_\_\_\_, Semester hours \_\_\_\_\_.

	1	2	3	4	5	over 5
Years taught in South Dakota	—	—	—	—	—	—
Years taught outside South Dakota	—	—	—	—	—	—
Years in present location	—	—	—	—	—	—

The following is a list of general industrial arts areas; indicate where you received your training in these areas.   x  

Gen. Industrial Arts Areas	Learned in college	Self-taught	Practical experience	Other	Little or no training
Drawing					
Woodworking					
Metalworking					
Mechanics					
Electricity					
Crafts					
Graphic arts					

How much help do you feel that you received in college toward being adequately prepared to teach in the general industrial arts areas listed below.

Gen. Industrial Arts Areas	Enough help in college	Some help	No help	Not important to stress
Drawing				
Woodworking				
Metalworking				
Mechanics				
Electricity				
Crafts				
Graphic arts				

IV. ADDITIONAL COMMENTS AND/OR SUGGESTIONS CONCERNING THE QUESTIONNAIRE:

THANK YOU FOR YOUR COOPERATION

The information in this study will be compiled for all public secondary schools offering industrial arts. No individual cases will be published.

## APPENDIX D

LETTER SENT TO INDUSTRIAL ARTS INSTRUCTORS IN SOUTH DAKOTA  
SECONDARY PUBLIC SCHOOLS

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Dear Fellow Shopman:

You are listed with the Department of Public Instruction as an industrial arts instructor. I would like to ask your assistance in making this study of industrial arts in the public secondary schools of South Dakota. I am using this survey as a basis for a thesis to be offered toward a Master of Science Degree at South Dakota State College.

It is hoped that through this study ways will be found to enrich and broaden the industrial arts curriculum in our teacher training institutions to meet the needs of you, our teachers. I feel that the scope of our high school program is directly related to the range of courses offered in our college programs.

Please help me by filling out the enclosed form TODAY and return it in the self-addressed envelope.

If you are interested in a summary of my thesis, I will be glad to send you a copy upon its completion.

Thank you for your cooperation.

Yours truly,

Wayne L. Salmen