RURAL INDUSTRIAL ARTS PROGRAMS IN MONTANA AND TECHNOLOGY EDUCATION

by

Scott Edward Davis

A professional paper submitted in partial fulfillment
of the requirements for the degree

of

Master of Science

in

Industrial Arts Education

MONTANA STATE UNIVERSITY
Bozeman, Montana

July 1985

P378
D297
Cop.2

APPROVAL

of a professional paper submitted by

Scott Edward Davis

This professional paper has been read by each member of the professional paper committee and has been found to be satisfactory regarding content, English usage, format, citation, bibliographic style, and consistency, and is ready for submission to the College of Graduate Studies.

July 25, 1985
Date

Doug Tolstedt
Chairperson, Graduate Committee

Approved for the Major Department

July 25, 1985
Date

Maj S. Anderson
Head, Major Department

Approved for the College of Graduate Studies

7-29-85
Date

Michael P. Malone
Graduate Dean

STATEMENT OF PERMISSION TO USE

In presenting this professional paper in partial fulfillment of the requirements for a master's degree at Montana State University, I agree that the Library shall make it available to borrowers under rules of the Library. Brief quotations from this paper are allowable without special permission, provided that accurate acknowledgment of source is made.

Permission for extensive quotation from or reproduction of this paper may be granted by my major professor, or in his absence, by the Dean of Libraries when, in the opinion of either, the proposed use of the material is for scholarly purposes. Any copying or use of the material in this paper for financial gain shall not be allowed without my permission.

Signature Scott E. Davis

Date July 26, 1985

ACKNOWLEDGMENTS

The author wishes to acknowledge the help which the staff of the Department of Agriculture and Industrial Education provided. Special recognition goes to this candidate's graduate committee: Dr. Doug Polette, Dr. Ken Bruwelheide and Dr. Robert Thibeault.

The author also wishes to acknowledge the support and assistance which his family provided throughout this educational experience.

TABLE OF CONTENTS

		Page
APPROVAL		ii
STATEMENT OF PERMISSION TO USE		iii
VITA		iv
ACKNOWLEDGMENTS		v
TABLE OF CONTENTS		vi
LIST OF TABLES		viii
ABSTRACT		x
Chapter		
1	INTRODUCTION	1
	Statement of the Problem	2
	Need for the Study	2
	Specific Objectives	3
	Assumptions	4
	Limitations	4
	Definitions	4
2	REVIEW OF THE LITERATURE	6
	Introduction	6
	Education in Review	6
	Industrial Arts and General Education	8
	Industrial Arts and Vocational Education	9
	Industrial Arts and Technology Education	10
	Summary	11
3	PROCEDURE	13
	Panel Selection and Methodology	13
	Development of the Instrument	14
	Data Analysis	15
4	PRESENTATION AND INTERPRETATION OF DATA	17

TABLE OF CONTENTS—Continued

Page

5 SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS 58

Summary 58
Conclusions 59
Recommendations 60

BIBLIOGRAPHY 61

APPENDICES 64

Appendix A — Study Participants 65
Appendix B — Cover Letter, Sample Survey, and Participants 70
Appendix C — Cover Letter and Round One 74
Appendix D — Cover Letter and Round Two 77

LIST OF TABLES

Tables		Page
1.	Mailing Rounds. Respondents	17
2.	Statement 1. Emphasis on Craftmanship	18
3.	Statement 2. Incorporates Basic Acadmic Skills	19
4.	Statement 3. More Emphasis on Planning	21
5.	Statement 4. Understand the Technological Society	22
6.	Statement 5. Product Producing Experiences	23
7.	Statement 6. Technology in Their Area	25
8.	Statement 7. Problem Solving a Key Component	26
9.	Statement 8. Use Tools, Materials and Processes	27
10.	Statement 9. Communication, Construction, Manufacturing, and Transportation	29
11.	Statement 10. Utilizes Concepts of Industry and Technology	30
12.	Statement 11. Techniques Identified by Leaders	31
13.	Statement 12. Maintains Current Knowledge	33
14.	Statement 13. Interdisciplinary Support	34
15.	Statement 14. Experience Around Projects and Crafts	35
16.	Statement 15. Experience Around Research and Experimentation	37
17.	Statement 16. Cope With the Technological Era	38
18.	Statement 17. Technological Advances	39
19.	Statement 18. Stresses Craftmanship	41
20.	Statement 19. Manipulative Skills of Immediate Value	42
21.	Statement 20. Prepare Them For Employment	43

Tables

Page

22. Statement 21. Work Experience 45
23. Statement 22. Industrial and Technological Society 46
24. Statement 23. Goals of State and National Standards 47
25. Statement 24. Incorporate with Other Subjects 49
26. Statement 25. Creative Development Involving Industry. 50
27. Statement 26. Entry Into Advanced Programs 51
28. Teachers and Administrators' Response to Statements 1-10 52
29. Teachers and Administrators' Response to Statements 11-18 53
30. Teachers and Administrators' Response to Statements 19-26 54
31. Comparative Response to Statements 1-10 55
32. Comparative Response to Statements 11-18 55
33. Comparative Response to Statements 19-26 56

ABSTRACT

The purpose of this study was to determine the extent to which current technology based curriculum in the field of industrial arts exists in rural public secondary schools of Montana. The study was undertaken because of the increased attention given technology education in the United States.

A Delphi technique was used to gather data concerning 26 statements relating to the state of the art and traditional industrial arts programs. Sixty participants, 30 teachers and 30 administrators, of rural Class C schools in Montana were involved in the study. Two mailings of the instrument were used to collect data for the Delphi.

The major conclusions of the study indicate that there was still major emphasis being placed on industrial arts programs which were project oriented and placed emphasis on craftmanship. Further conclusions indicate that there were some industrial arts programs which employed some elements of a technology based curriculum. Furthermore, little difference existed between the responses of the teachers and administrators in relation to the survey statements.

CHAPTER 1

INTRODUCTION

Nationally there exists the idea that schools are out of step with the needs of the American population (Annison, 1983, 4). The failure of education to meet the needs of students and the needs of society are reflected in the lack of technological preparedness students demonstrate upon graduation from secondary schools. Not only are there high school students lacking the basic skills to work with the new technology, but some workers in business do also (Southern Illinois University, 1983, 15). The question arises, "How do we solve the problem of technological unpreparedness of our students?" The industrial arts curriculum can address technology education if the role and scope of the traditional program is changed. Dr. Myron Bender (1982) states:

> The key difference between the traditional industrial arts program and a technology education program is the nature of the content as well as the process. A further distinction can be made in that the traditional programs focus on skills and objects where technology education focuses on human processes related to technical endeavors. (p. 64)

Throughout Montana there are numerous small rural schools with industrial arts programs. At issue is how well these industrial arts programs are incorporating state of the art curriculums designed by leading experts in the field of industrial arts today. It is important to identify how rural instructors and administrators feel about the proposed changes toward technology education in the field of industrial arts in Montana.

Statement of the Problem

The purpose of this study was to determine the extent to which current technology based curriculum in the field of industrial arts exists in the rural public secondary schools in Montana.

Need for the Study

There is an everwidening gap between that which should be taught about technology in the public schools and that which is taught (Devore, 1975, 29). Our failure to provide technology education in our schools is resulting in a somewhat curious problem—the creation of technologically illiterate individuals (Heyer, 1983, 23). One of the major purposes of education is to prepare students to live in society as it currently exists and how it may exist in the future. If we are to prepare our young people for their own future, we cannot afford to omit the study of technology from the public school curriculum (Heyer, 1983, 23). They must be aware of how their individual lives and society as a whole may be affected by technology (Pytlik, 1981, 37). The emphasis on providing technology education could better prepare students for decision making in a complex technological world (Wright, 1980, 35).

In a critical issues paper dealing with technology education in Montana, Dr. John Kohl (1983) of Montana State University states:

> It is abundantly clear that the role of public education in our state (Montana) and nation must shift dramatically from one in which youth are taught basic skills to prepare for entry into the labor market to a system in which all citizens are educated broadly for life, work and full participation in the information oriented society of the future. (pp. 1-2)

Montana educators must determine if they are meeting the needs of students for the future. The concept of technology and its impact is on almost every list which deals with education for this decade and beyond (Lauda, 1979, 29). Rural communities are not

immune to technological advances in society. Unfortunately, to date, rural communities have not benefitted from the technology that could provide the resources they need to compete with urban and suburban education units (Kohl, 1983, 10).

The data collected from the rural public schools may provide background as to what is needed to determine the role of industrial arts in the teaching of technology in rural schools in Montana. The information collected may provide a background for the assessment of rural industrial arts programs in Montana in relation to advanced or state of the art programs designated by industrial arts leaders in the United States. Nationwide, leaders in industrial arts education are initiating changes in industrial arts programs. Most research projects have identified four sub-systems inherent within the adaptive system called technology: communication, construction, manufacturing, and transportation (Lauda, 1983, 9). Other leaders in their studies have stated similar topics. The subsystems of the human technical endeavor are communication, construction, manufacturing, and transportation (Hales and Snyder, 1982, 6). The data collected in the research may determine if rural industrial arts programs exemplify state of the art programs as designated by industrial arts experts nationwide.

Specific Objectives

The following objectives were identified for this study:

1. Determine if there are any state of the art rural technological based industrial arts programs in public secondary schools in Montana.
2. Determine the attitude of rural industrial arts teachers and administrators in Montana toward state of the art industrial arts programs.
3. Determine the need for implementing state of the art rural technological based industrial arts programs.

Assumptions

This study was based on the following assumptions:

1. Montana's population partly consists of many small rural communities which have public secondary high schools.
2. The students who are graduating and leaving these schools do not have the technological background which is required in the society in which we live today.
3. A large percentage of Montana students will continue to be trained in industrial arts programs in small rural type high school settings.
4. Montana's isolation from major centers of manufacturing partly affects the amount of technological information which the students do or do not receive.

Limitations

The following limitations were identified for this study:

1. The study will be directed at teachers and administrators in public secondary Class C schools in Montana.
2. Due to the size of the study population, the data may provide only a partial background for further research of technology based industrial arts programs in the rural schools of Montana.

Definitions

The following terms are defined in order to minimize misunderstanding:

1. Innovative—state of the art; futuristic in character.
2. Rural—set apart from major population centers; dominated by agricultural interests.

3. Technology—the study of the technical means that have always been a primary determinant of cultural change (Lauda, 1983, 9).
4. Technical—includes terms that deal with technical hardware, processes and practical experience (Bender, 1982, 61).
5. Technological—includes terms that deal with relationships between humans and their technology including social, cultural and personal experiences (Lauda, 1984, 4).
6. Traditional industrial arts—the handing down of statements, beliefs, legends, customs, etc., from generation to generation by word of mouth or by practice (Bender, 1982, 55).
7. Class C Schools—schools that are not classified as "AA", "A", or "B" will be classified as Class "C" for basketball purposes, to be divided into thirteen districts and four divisions (MHSA, 1984, 96).
8. Vocational education—organized educational programs which are directly related to the preparation of individuals for paid or unpaid employment, or for additional preparation for a career requiring other than a baccalaureate or advanced degree (Calhoun & Finch, 1982, 2).
9. General education—addresses the learner as a responsible human being and citizen, not as a specialist or one with unique gifts or interests (McNeil, 1985, 90).

CHAPTER 2

REVIEW OF THE LITERATURE

Introduction

The system in education of tracking provides for identifying curriculum as belonging to the academic area where students are provided background for entering higher education; the vocational area where students develop particular work skills; and general education which provides a basic background from which students can develop further interests. The information in this chapter addresses four major subtopics:

1. Education in review
2. Industrial arts and general education
3. Industrial arts and vocational education
4. Industrial arts and technology education

Education in Review

Hales and Synder (1980) in the Jackson's Mill Curriculum project identified the following about educational systems: "The educational system is charged with the responsibility of preparing children to assume a constructive role in a changing world" (p. 1). Education has not kept up with technological advancements. Backward educational practices have damaged the role education plays in today's society. After years of shameful neglect, educators and politicians have taken the pulse of the public school and found it faint (Boyer, 1983, 1). Schools are not offering educational programs which will enable students to make wise choices in the future. Students need educational experiences which provide a

basis for facing a radically changing society full of new and novel situations (Wright, 1981, 9). Lack of commitment by teachers, administrators and school boards may be part of the problem with ineffective schools. After visiting schools from coast to coast, we are left with the distinct impression that high schools lack a clear and vital mission (Boyer, 1983, 63). Dr. Myron Bender (1982) states, "A major educational change of our time is the development of human capacity needed to shape wisely and adapt actively to the rapidly changing technological society" (p. 57). Schooling should provide insight into the relationship of technical means to human beings, social purpose, and the environment (Hales & Synder, 1980, 14).

Technology education can provide information aiding decision-making in our changing industrial society. In today's world, few societies, if any, escape the many transformations fostered by industrial growth (Hales & Synder, 1980, 21). The effect of technological advancements is ever so evident in industry. Michael Hacker (1982) stated, "At some point in an individual's schooling, mysteries that shroud technological processes must be unveiled so that the complexities of our surroundings become more comprehensible" (p. 4). Technological advancement has brought the citizenry of the world closer together. As pointed out by Earnest Boyer (1983) in his book on education in the United States, "What happens in the farthest corner of the world now touches us almost instantly" (p. 3).

Rural education constitutes a sizable portion of education in the United States. The rural schools enroll about 4.1 million students (Boyer, 1983, 20). Few rural communities in Montana are immune to technological advancements. This is most evident in the way personalized computers are used to keep records for farming and ranching operations to the computerized monitoring of combine functions. The effect of these advancements in rural communities needs to be made evident to students. Educational systems provide a pathway for this information to be distributed. Montana educational policy and applications must reflect the impact of technology on the education provided (Kohl, 1983, 11).

Industrial Arts and General Education

The philosophical basis of general education is to provide students with a broad educational background full of varied experiences. The concept of general education provides for a universal education; it is an education for the general population designed to encourage the development of the people into contributing members of society (Starkweather, 1979, 63). General education had its beginning with one of the founding fathers of America. In 1751, Benjamin Franklin established a secondary school in Philadelphia to instruct people in more practical skills, such as letter writing and accounting (Boyer, 1983, 43). This constituted the beginning of general education in the United States.

Industrial arts initial association with general education was to provide students with basic skills. Industrial arts as part of general education has been related to manipulative skills, leisure activities, consumer literacy, cultural heritage, the industrial society, and the study of technology (Starkweather, 1979, 69). The development of avocational skills became a familiar characteristic of traditional industrial arts education programs. Traditional industrial arts seemed to focus primarily on leisure time interest and skills (LaPorte, 1982, 77). As our society has changed so should the educational system change to reflect technological advancements. Industrial arts as a subject matter within the school environment, prepares learners of all ages and ability levels to become productive and contributing members of an industrial technological society (Hales & Synder, 1980, 39). Providing educational experiences involving modern industrial processes should be a major goal of industrial arts programs. Dr. Michael Kozak (1982), a leader in industrial arts education stated, "Today's industrial arts program must work in the educational environment of today, reflect today's needs and anticipate tomorrow's technological society" (p. 57).

In order for education to become a viable force in America, it must relinguish some of the traditions it has so rightly or wrongly held onto. Traditional industrial arts programs

should change to reflect the needs of students and society. For industrial arts to maintain a major role in our educational system, instructors will have to continually evaluate their programs to identify if the students' needs are being met. Programs that are still teaching the traditional program will find themselves hardpressed to justify their existence and, ultimately, will be under attack by industry as well as administrators (Grannis, 1984, 3). A commitment to educational curriculums which will meet the needs of society and students must be made by educational leaders. Industrial arts, as one of the disciplines of schooling, has a body of knowledge which can be identified, contributes to technological literacy and enhances human potential (Hales & Synder, 1980, 1).

Industrial Arts and Vocational Education

Vocational education evolved from societal need for a productive labor force. A basic requirement of society is that positions necessary to its continued existence be filled by capable individuals (Calhoun & Finch, 1982, 3). Jobs change as technology changes. Dr. Michael Annison (1983) depicted future job occupations in this manner, "Basically, we are going to transform jobs and change where they are in this country" (p. 4). The scope of vocational education programs must also change to meet the needs of the students and society. Vocational educators must learn to reexamine their positions continually and to respect traditions only so long as they are compatible with the real needs of people (Calhoun & Finch, 1982, 11). A study by Southern Illinois University (1983) found this about vocational education; "Specifically, vocational education must initiate efforts to more adequately prepare students for jobs in the new technology, or risk being replaced by business who will do their own educating" (p. 16).

Industrial arts has been associated with vocational education for funding purposes since 1973. In December 1973, industrial arts was added to Public Law 92-318 and officially became part of the group of vocational education programs eligible for federal aid

(Calhoun & Finch, 1982, 211). J. Trump and D. Miller (1977) established industrial arts role in vocational education as being minimal; "The vocational overtones in industrial arts are secondary" (as cited by Rubin, p. 250). Educational researcher Earnest Boyer (1983) said this about vocational education; "Increasingly, it appears, high school vocational programs will be either irrelevant or inadequate" (p. 123).

Industrial Arts and Technology Education

Technological advancements have affected today's educational system. Technological trends will continue to be the major drivers of change in coming years (Edgar, 1984, 4). Students in today's educational systems need to realize and understand the role of technology in our society. A review of the past, prior to and after the Industrial Revolution can well illustrate this point.

The understanding of technology can aid decision-making in the future. Jacobs and Ritz (1981) stated the importance of understanding technology in this manner:

> Knowledge of complexities and interrelationships among our major technological systems and the concomitant vital input of materials technology can provide an intelligent citizenry that grasps the need for long term research, planning, and short term sacrifices to maintain stability, and an appropriate standard of living for the nation while making wise decisions regarding "limits to growth." (p. 32)

Reorganization of traditional industrial arts programs for technology education appears needed. Most industrial arts curriculums need reorganization both in their concepts and in their objectives (Trump & Miller, as cited by Rubin, 1977, 250). An original conception of industrial arts was to teach practices and processes of industry. Technology has changed the operational method of industry. Industrial arts recognition of technological advancements in industry needs to be identified. It seems appropriate for the industrial arts profession to encourage and promote a change in content emphasis from a craft/industrial orientation to a modern technology approach (Wright, 1980, 35).

Technology education is a broad term which implies more than an understanding of technical matter. The study of technology involves the study of a technical component and the socio-cultural dimension inherent within it (Lauda, 1979, 29). The introduction of technology education would broaden the scope of industrial arts. What were once separate, descrete crafts, trades or enterprises with one-dimensional relationships have become systems or subsystems with multidimensional relationships (Hales & Synder, 1980, 3). Earnest Boyer (1983) made this recommendation for technology education: "We recommend that all students study technology: The history of man's use of tools, how science and technology have been joined, and the ethical and social issues technology has raised" (p. 110). Dr. Paul Devore (1984) further identified the importance of technology education:

> The goal of technology education—the study of the creation and use of technical means (tool, machines, techniques, technical systems and the behavior of technical systems in relation to people, society, and the environment)—is to educate people to design and make the transition to technological systems that are sustainable. (p. 10)

Technology education in industrial arts is becoming increasingly important and industrial arts leaders around the nation are beginning to recognize the role which technology education can play in our society. Trump and Miller (1977) had this to say about technology education and industrial arts:

> Despite differences in approach, there is growing agreement among industrial arts educators, that the dominant objective of industrial arts should be that of providing an understanding of American industry and an awareness of its changing technology. (As cited by Rubin, p. 256)

Summary

The review of literature provides documentation of the fact that changes need to be made in the role and scope of the traditional industrial arts program. Whether industrial arts is viewed as being part of general education or vocational education, the role and scope

of the current program should involve an element of technology education. It appears evident that teaching strictly technical skills is not enough. The manner in which technological developments have affected society should be taught also. Background information to current technological trends should be presented in order for students to gain an understanding of the society in which we live. Decisions affecting their future as well as society's can then be made more wisely.

CHAPTER 3

PROCEDURE

This chapter provides background information on the procedure which was followed in this study. The information presented is developed around three major sections. Section one describes how the panel or sample was developed. Information regarding the use of a modified Delphi technique used in the study can also be found in section one. The second section of Chapter 3 contains information regarding the development of the instrument which was used to gather data for the study. The third and final section describes the statistical method used to analyze the data.

Panel Selection and Methodology

The population for the survey was identified from the *1984-1985 Directory of Montana Industrial Education Personnel* and the *Directory of Montana Schools: 1984-1985*. Both resources were published by the Office of Public Instruction of the state of Montana. The parameters of the population were established by the definition of Class C schools. A review of existing rural industrial arts education programs in Class C schools in Montana revealed there were 50 rural industrial arts teachers and 67 administrators in public secondary schools. The total population from which the sample for the Delphi study was selected included 117 individuals. From this population 30 administrators and 30 teachers were selected for the sample. The 60 member sample for the study was drawn randomly by using the MSUSTATS program developed by Dr. Richard Lund of Montana State University. The list of the 60 participants can be found in Appendix A.

A modified Delphi method was used to gather data and provide for partial analysis of the data. The Delphi Method, which grew out of the work of Olaf Helmer and Norman Dalkey, was originally intended as a tool for the scientific and technological forecasting of the future (Gorton, 1984, 26). The Delphi method was chosen because it allowed for the gaining of group consensus and is often used for identifying "what is" to "what should be". Hostrop (1973) stated this about the Delphi: ". . . it (Delphi) provides a means for assessing 'what is' (organizational conditions) and 'what should be' (goals and objectives)" (p. 76). Other benefits of the Delphi have been recognized. For instance, the Delphi Technique was created to prevent professional status and high position from forcing judgments in certain directions when panels of experts met (Weaver, 1971, 270). In a normal conference meeting the status and prestige of an individual may result in the adopting of that point of view. Each participant may not have a chance for input. The Delphi participants are anonymous to each other thus allowing for each member of the population to present his or her opinion.

Development of the Instrument

The instrument for this Delphi study was developed by reviewing established questionnaires and instruments designed to identify state of the art and traditional industrial arts programs. Eight of the statements originated from the *Standards for Industrial Arts Program* document developed by Dr. William Dugger. Nine statements originated from a questionnaire mailed out in 1981 by L. Dayle Yeager and Leon T. Harvey. The remaining statements can trace their origin to a survey conducted by Gene H. Russel. Statements from the existing instruments relating to the specific objectives of this study were identified and grouped together to form the basis for the instrument of this Delphi study. The first 10 statements were directed at identifying traits of existing industrial arts programs. Survey

statements 11-18 were directed at identifying teacher characteristics. Survey statements 19-26 sought perceptions of what industrial arts curriculums should contain.

After the questions were grouped relating to the specific objectives, they were subjected to a panel for review of construct validity. The cover letter and list of the participants involved for checking the construct validity can be found in Appendix B. The panel included college personnel and a randomly selected group of ten administrators and teachers who were not selected for the main study. Changes recommended by a consensus resulted in adaptations to the questions in the instrument.

The first mailing of the instrument to the population sample occurred on March 29. The first mailing included a cover letter explaining the purpose of the study and round one of the instrument. Copies of each can be found in Appendix C. Fourteen days were given to complete and return round one of the instrument. Upon compilation of round one score results, round two was mailed on April 19, 1985 to the teachers and administrators who responded to round one. Again 14 days were given for the completion of the instrument for the second round. Round two of the Delphi study differed from round one in that it was printed on a different color of paper and it contained the mean of score results for round one. A copy of the cover letter and the instrument used in round two can be found in Appendix D.

Data Analysis

The statistical method chosen for data analysis of scores was the t test. The t test allows for the analysis of unequal pairs of numbers of data or scores. Another consideration for using the t test was the relatively low number of samples involved in the study. With small samples the distribution of t provides for many statistics a more appropriate model (Ferguson, 1981, 162). The t test involves the comparison of mean scores with the

sum of the squared scores. Another factor involved with t test results is the level of significance which was established at .05 for this study. Each statement on the survey was analyzed in relation to the scores it received. A comparison between the calculated critical value and the established critical value set by the level of significance and the degrees of freedom provided the basis as to whether the score fell within reasonable boundaries. Unless the calculated critical value exceeded the established critical value for the degrees of freedom and the level of significance, the score differences were insignificant. In reference to the tables which follow in Chapter 4, "the symbol df is frequently used to represent degrees of freedom" (Ferguson, 1981, 163). Degrees of freedom provide a numerical value which represents the population or sample size. When the degrees of freedom were used in conjunction with the level of significance, a critical value was established. The established critical value set the limit as to how much the calculated critical value could vary. Degrees of freedom means freedom to vary (Downie & Heath, 1965, 221). The degrees of freedom are established by the number of individuals in the population or sample. The degrees of freedom may vary from statistical formula to statistical formula.

The procedure used for computing the t test scores can be found on pages 380-382 in *Educational Research* by Edward Vockell. Critical values for the degrees of freedom of the t test were determined by reviewing page 28 in the *Handbook of Statistical Tables* by D. B. Owen. A complete reference of the books can be found in the bibliography.

CHAPTER 4

PRESENTATION AND INTERPRETATION OF DATA

Industrial arts teachers and administrators of small rural public schools comprised the panel involved in the study. A complete listing of personnel involved can be found in Appendix A. The Delphi method provides for the consecutive mailings of the instrument in order to gain a consensus. Two mailings of the instrument occurred in this modified Delphi study. The mean of the first round provided an additional selection category for round two. The mean was derived by dividing the sum of the scores of the participants in round one, both teachers and administrators, by the number of participants. In round two, participants could select the mean of round one or any one of the other four options.

The data in Table 1 are in reference to the number of teachers and administrators who responded to the instrument. Analysis of the data reveal 25 or 83% of the teachers responded to round one of the survey. Nineteen or 76% of the teachers responding to round one responded in round two. Administrative response reveals 20 or 68% of the administrators responded to round one of the survey. Of the 20 administrators responding in round one, 15 or 75% responded to round two of the survey.

Table 1. Mailing Rounds. Respondents.

		Rd. #1		Rd. #2	
	N	#	%	#	%
Teachers	30	25	83	19	76
Administrators	30	20	68	15	75

The data in Table 2 are in reference to survey statement number one; The industrial arts curriculum currently places emphasis on craftmanship in laboratory projects. Score results reveal that 24 or 96% of the teachers responding in round one agreed or strongly agreed with the statement. Also, one teacher or 4% of those responding in round one disagreed with the statement. Round two score results reveal 15 or 79% of the teachers agreed or strongly agreed with the statement. The mean, 3.5, was chosen by four or 21% of the teachers responding in round two. The calculated critical value for the teachers responding to this question for both rounds was .949. The degrees of freedom for the teachers for this statement were 42 with a critical value of 2.419. The calculated critical value, .949, did not exceed the established value, 2.419. The difference between the teachers' scores for both rounds were insignificant for survey statement one.

Table 2. Statement 1. Emphasis on Craftmanship.

		SD 1		D 2		A 3		SA 4		$\bar{X}$ Rd. #1 3.5		Calculated Critical
	N	#	%	#	%	#	%	#	%	#	%	Value
Tea. Rd. #1	25	0	0	1	4	11	44	13	52			.949
Tea. Rd. #2	19	0	0	0	0	5	26	10	53	4	21	
Adm. Rd. #1	20	0	0	0	0	9	45	11	55			.877
Adm. Rd. #2	15	0	0	0	0	8	53.3	5	33.3	2	13.3	

Critical value for df of 42 = 2.419.
Critical value for df of 33 = 2.445.

The score results of the administrators responding to survey statement one an also be found in Table 2. Score results reveal that all 20 of the administrators responding to round one agreed or strongly agreed with statement number one. Thirteen or 86.6% of the administrators responding in round two agreed or strongly agreed with the statement.

The mean, 3.5, in round two was chosen by two or 13.3% of the administrators responding. The calculated critical value for the administrators for round one and round two was .877. The degrees of freedom for the administrators for both rounds were 33 with a critical value of 2.445. The calculated critical value, .877, did not exceed the established value, 2.445. The differences in the administrators' scores between round one and round two were insignificant for survey statement number one.

The data in Table 3 are in reference to statement number two on the survey; The industrial arts curriculum currently incorporates basic academic skills. All the teachers in round one agreed or strongly agreed with survey statement number two. Score results for round two reveal that 15 or 79% of the teachers responding agreed or strongly agreed with the statement. Four or 21% of the teachers in round two chose the mean, 3.5. The calculated critical value for teachers for score differences between round one and round two was .909. The degrees of freedom for the teachers for both rounds were 33 with a critical value of 2.419. The calculated critical value, .909, did not exceed the established value, 2.419. The differences between the teachers' scores for survey statement two for both rounds were insignificant.

Table 3. Statement 2. Incorporates Basic Academic Skills.

		SD 1		D 2		A 3		SA 4		$\bar{X}$ Rd. #1 3.5		Calculated Critical Value
	N	#	%	#	%	#	%	#	%	#	%	
Tea. Rd. #1	25	0	0	0	0	13	52	12	48			.909
Tea. Rd. #2	19	0	0	0	0	10	53	5	26	4	21	
Adm. Rd. #1	20	0	0	1	5	12	60	7	35			1.28
Adm. Rd. #2	15	0	0	2	13.3	9	60	2	13.3	2	13.3	

Critical value for df of 42 = 2.419.
Critical value for df of 33 = 2.445.

Table 3 also contains the administrators' response to survey statement number two. Score results of round one for administrators reveal that 19 or 95% of those responding agreed or strongly agreed with survey statement number two. One administrator or five percent of those responding to round one disagreed with the statement. Round two score results reveal 11 or 73.3% of the administrators responding agreed or strongly agreed with the statement. Two or 13.3% of those responding to round two disagreed with the statement. The mean, 3.5, was chosen by two or 13.3% of the administrators responding to round two. The calculated critical value of the difference between the administrators' scores for both rounds was 1.28 for survey statement two. The degrees of freedom for the administrators for both rounds were 33 with a critical value of 2.445. The calculated critical value, 1.28, did not exceed the established value, 2.445. The differences in the administrators' scores between round one and round two for survey statement two were insignificant.

The data in Table 4 are in reference to survey statement number three; The industrial arts curriculum currently places more emphasis on planning than on executing projects. Score results of round one reveal 13 or 52% of the teachers responding agreed or strongly agreed with the statement. Round one results also reveal 12 or 48% of the teachers responding disagreed or strongly disagreed with the statement. Round two score results reveal six or 32% of the teachers agreed with the statement. Ten or 52% of the teachers in round two disagreed or strongly disagreed with the statement. Furthermore, three or 16% of the teachers in round two chose the mean, 2.5, for statement number three. The calculated critical value of the scores of the teachers for both rounds was 1.23. The degrees of freedom for the teachers in both rounds were 42 with an established critical value of 2.419. The calculated critical value, 1.23, did not exceed the established value, 2.419. The differences in the teachers' scores between rounds for survey statement number three were insignificant.

Table 4. Statement 3. More Emphasis On Planning.

	N	SD 1 #	%	D 2 #	%	A 3 #	%	SA 4 #	%	$\bar{X}$ Rd. #1 2.5 #	%	Calculated Critical Value
Tea. Rd. #1	25	1	4	11	44	11	44	2	8			1.23
Tea. Rd. #2	19	1	5	9	47	6	32	0	0	3	16	
Adm. Rd. #1	20	2	10	9	45	7	35	2	10			.082
Adm. Rd. #2	15	0	0	7	46.7	6	40	0	0	2	13.3	

Critical value for df of 42 = 2.419.
Critical value for df of 33 = 2.445.

Score results of the administrators for survey statement three can also be found in Table 4. Round one score results for administrators reveal nine or 45% of those responding agreed or strongly agreed with survey statement three. Eleven or 55% of the administrators responding in round one disagreed or strongly disagreed with the statement. In round two, six or 40% of the administrators responding agreed with the statement. Score results for round two also reveal that seven or 46.7% of the administrators responding disagreed with the statement. The mean, 2.5, was chosen by two or 13.3% of the administrators responding to round two. The calculated critical value of the administrators' scores for both rounds was .082. The degrees of freedom were 33 with an established critical value of 2.445. The calculated critical value, .082, did not exceed the established value, 2.445. The differences in the administrators' scores between rounds for survey statement number four were insignificant.

The data in Table 5 are in reference to survey statement number four; The industrial arts curriculum currently increases student's ability to synthesize and understand the broad spectrum of technological society. Score results of round one for teachers reveal that 22 or 88% of those responding agreed or strongly agreed with the statement. Three or 12% of

the teachers responding to round one disagreed with the statement. Round two score results reveal 10 or 53% of the teachers responding agreed with the survey statement. Five teachers or 26% disagreed with the statement number four. The mean, 2.8, was chosen by four or 21% of the teachers responding in round two. The calculated critical value of the teachers' scores in both rounds for survey statement four was .794. The degrees of freedom for the teachers were 42 with an established critical value of 2.419. The calculated critical value, .794, did not exceed the established value, 2.419. The differences in the teachers' scores of the two rounds for survey statement number four were insignificant.

Table 5. Statement 4. Understand the Technological Society.

		SD 1		D 2		A 3		SA 4		$\bar{X}$ Rd. #1 2.8		Calculated Critical Value
	N	#	%	#	%	#	%	#	%	#	%	
Tea. Rd. #1	25	0	0	3	12	20	80	2	8			.794
Tea. Rd. #2	19	0	0	5	26	10	53	0	0	4	21	
Adm. Rd. #1	20	2	0	5	25	15	75	0	0			1.195
Adm. Rd. #2	15	0	0	6	40	6	40	0	0	3	20	

Critical value for df of 42 = 2.419.
Critical value for df of 33 = 2.445.

Table 5 also contains the score results of the administrators for survey statement four. Round one score results for administrators reveal 15 or 75% of those responding agreed with survey statement number four. Results also reveal with five or 25% of the administrators in round one disagreed with the statement. Score results for round two reveal six or 40% of the administrators agreed with the statement. That same number, six or 40% of those responding, disagreed with the statement in round two. The mean, 2.8, was chosen by three or 20% of the administrators in round two. The calculated critical value of the administrators' scores for both rounds for survey statement number four was 1.195. The

degrees of freedom for the administrators were 33 with a critical value of 2.445. The calculated critical value, 1.195, did not exceed the established value, 2.445. The differences in the administrators' scores between the two rounds were insignificant for survey statement number four.

The data contained in Table 6 are in reference to survey statement number five; The industrial arts curriculum currently develops product producing experiences along with supportive skills and technical knowledge. Score results of round one for the teachers reveal 24 or 96% of those responding agreed or strongly agreed with the statement. Only one or 4% of the teachers responding to round one disagreed with the statement. Results of round two reveal that 15 or 79% of the teachers agreed or strongly agreed with survey statement number five. Two or 11% of those responding to round two disagreed with the statement. Another two or 11% of the respondents chose the mean, 3.1. The calculated critical value of the teachers' scores for both rounds was .649. The degrees of freedom were 42 with an established critical value of 2.419. The calculated critical value, .649, of the teachers' scores for survey statement number five did not exceed the established value, 2.419. The differences in the teachers' scores between rounds for survey statement five were insignificant.

Table 6. Statement 5. Product Producing Experiences.

		SD 1		D 2		A 3		SA 4		$\bar{X}$ Rd. #1 3.1		Calculated Critical
	N	#	%	#	%	#	%	#	%	#	%	Value
Tea. Rd. #1	25	0	0	1	4	20	80	4	16			.649
Tea. Rd. #2	19	0	0	2	11	10	53	5	26	2	11	
Adm. Rd. #1	20	0	0	1	5	16	80	3	15			1.136
Adm. Rd. #2	15	0	0	1	6.7	12	80	0	0	2	13.3	

Critical value for df of 42 = 2.419.
Critical value for df of 33 = 2.445.

Table 6 also included the administrators' score results for survey statement number five. Score results of round one for the administrators reveal 19 or 95% of those responding agreed or strongly agreed with survey statement five. Only one, or 5% of the administrators responding disagreed with the statement. Round two score results reveal 12 or 80% of the administrators responding agreed with statement five. Again, only one or 6.7% of those responding disagreed with the statement. The mean, 3.1, was chosen by two or 13.3% of the administrators responding to round two. The calculated critical value of both rounds of the administrators' scores for survey statement number five was 1.136. The degrees of freedom for the administrators for both rounds were 33 with a critical value of 2.445. The calculated critical value, 1.136, did not exceed the established value, 2.445. The differences in the administrators' scores between rounds were insignificant for survey statement number five.

The data in Table 7 are in reference to survey statement number six; The industrial arts curriculum currently provides instruction to help students understand the technology of their geographic area. The results for the teachers reveal 19 or 79% of those responding agreed or strongly agreed with the statement. Furthermore, five or 21% of the teachers responding in round one disagreed with the statement. Analysis of round two score results for the teachers reveal that 12 or 63% of those responding agreed or strongly agreed with survey statement number six. Two or 11% of the teachers in round two disagreed with the statement. The mean, 2.9, was chosen by five or 26% of the teachers responding in round two. The calculated critical value for the teachers for both rounds was zero. The degrees of freedom for the teachers for both rounds were 41 with an established critical value of 2.421 for survey statement number six. The calculated critical value, zero, did not exceed the established value, 2.421. The differences in the teachers' scores between rounds for survey statement number six were insignificant.

Table 7. Statement 6. Technology in Their Area.

	N	SD 1 #	%	D 2 #	%	A 3 #	%	SA 4 #	%	$\bar{X}$ Rd. #1 2.9 #	%	Calculated Critical Value
Tea. Rd. #1	24	0	0	5	21	16	66	3	13			0
Tea. Rd. #2	19	0	0	2	11	11	58	1	5	5	26	
Adm. Rd. #1	20	0	0	5	25	14	70	1	5			.06
Adm. Rd. #2	15	0	0	3	20	10	66.7	0	0	2	13.3	

Critical value for df of 41 = 2.421.
Critical value for df of 33 = 2.445.

The administrators' scores for survey statement number six can also be found in Table 7. Round one score results for administrators reveal 15 or 75% agreed with survey statement number six. Five or 25% of the administrators responding in round one disagreed with the statement. Round two score results reveal 10 or 66.7% of the administrators agreed with the statement. Three or 20% of those responding in round two disagreed with the statement. The mean, 2.9, was chosen by two or 13.3% of the administrators in round two. The calculated critical value for the administrators' scores for both rounds was .06. The degrees of freedom for both rounds of the administrators' scores for survey statement number six were 33 with a critical value of 2.445. The calculated value, .06, did not exceed the established value, 2.445. The differences in the administrators' scores between round one and round two for survey statement number six were insignificant.

The data in Table 8 are in reference to survey statement seven; The industrial arts curriculum currently has problem solving as a key component in each instructional area. Round one score results reveal 21 or 84% of the teachers responding agreed or strongly agreed with the statement. Four or 16% of the teachers responding to round one disagreed with the statement. Score results for teachers in round two reveal 13 or 68% of those

responding agreed or strongly agreed with survey statement number seven. Further analysis of round two results reveal that two or 11% of the teachers disagreed with the statement. The mean, 2.9, was chosen by four or 21% of the teachers in round two. The calculated critical value for the teachers for both rounds was zero. The degrees of freedom of the teachers for both rounds were 42 with an established critical value of 2.419. The calculated critical value, zero, did not exceed the established value, 2.419, for the teachers' responses to survey statement number seven. The differences in the teachers' scores between rounds for survey statement number seven were insignificant.

Table 8. Statement 7. Problem Solving a Key Component.

		SD 1		D 2		A 3		SA 4		$\bar{X}$ Rd. #1 2.9		Calculated Critical
	N	#	%	#	%	#	%	#	%	#	%	Value
Tea. Rd. #1	25	0	0	4	16	18	72	3	12			0
Tea. Rd. #2	19	0	0	2	11	12	63	1	5	4	21	
Adm. Rd. #1	19	0	0	5	26	13	69	1	5			0
Adm. Rd. #2	15	0	0	3	20	10	66.7	0	0	2	13.3	

Critical value for df of 42 = 2.419.
Critical value for df of 32 = 2.449.

The administrators' score results for survey statement seven can also be found in Table 8. Round one score results for the administrators reveal 14 or 74% agreed or strongly agreed with survey statement seven. Five or 26% of the administrators responding in round one disagreed with the statement. Further review of round two score results reveal 10 or 66.7% of the administrators agreed with the statement. Three or 20% of the administrators responding to round two disagreed with survey statement number seven. The mean, 2.9, was chosen by two or 13.3% of the administrators responding in round two. The calculated critical value was 0. The degrees of freedom for both rounds for administrators were 32

with a critical value of 2.449. The calculated critical value, 0, of the administrators' scores for survey statement seven did not exceed the established value, 2.449. The differences in the administrators' scores between rounds for survey statement seven were insignificant.

The data in Table 9 are in reference to survey statement eight; The industrial arts curriculum currently develops students' ability to use tools, materials, and processes to solve technical problems. All the teachers responding in round one agreed or strongly agreed with the statement. Round two scores results reveal 16 or 84% agreed or strongly agreed with the statement. The mean, 3.5, was chosen by three or 16% of the teachers in round two. The calculated critical value for the teachers' score results for both rounds was .340. The degrees of freedom of the teachers for both rounds were 42 with an established critical value of 2.419. The calculated critical value, .340, of the teachers' scores for survey statement eight did not exceed the established critical value of 2.419. The differences in the teachers' scores between rounds for survey statement eight were insignificant.

Table 6. Statement 8. Use Tools, Materials and Processes.

		SD 1		D 2		A 3		SA 4		$\bar{X}$ Rd. #1 3.5		Calculated Critical
	N	#	%	#	%	#	%	#	%	#	%	Value
Tea. Rd. #1	25	0	0	0	0	13	52	12	48			.340
Tea. Rd. #2	19	0	0	0	0	9	47	7	37	3	16	
Adm. Rd. #1	20	0	0	1	5	8	40	11	55			.692
Adm. Rd. #2	15	0	0	0	0	8	53.3	4	26.7	3	20	

Critical value for df of 42 = 2.419.
Critical value for df of 33 = 2.445.

The administrators' score results for survey statement eight can also be found in Table 9. Round one score results of administrators for survey statement eight reveal 19 or 95% of those responding agreed or strongly agreed with the statement. Only one, or 5% of the

administrators responding in round one disagreed with the statement. Score results of round two for survey statement eight reveal that 12 or 80% of the administrators responding agreed or strongly agreed with the statement. The mean, 3.5, was chosen by three or 20% of the administrators responding in round two. The calculated critical for administrative response to survey statement eight was .692. The degrees of freedom of the administrators for survey statement eight were 33 with an established critical value of 2.445. The calculated critical value, .692, of the administrators' scores for survey statement eight did not exceed the established critical value, 2.445. The differences in the administrators' scores of both rounds for survey statement eight were insignificant.

The data found in Table 10 are in reference to survey statement nine; The industrial arts curriculum currently is offered in the broad categories of communication, construction, manufacturing, and transportation. The teachers' scores for round one reveal 13 or 52% agreed or strongly agreed with survey statement nine. Almost an even number of teachers, 12 or 48% disagreed or strongly disagreed with the statement. The teachers' round two score results for statement nine reveal six or 32% of those responding agreed with the statement. Ten or 52% of the teachers responding in round two disagreed or strongly disagreed with the statement. The mean, 2.6, was chosen by three or 16% of the teachers responding in round two. The calculated critical value of the teachers' scores for both rounds in relation to survey statement nine was 1.07. The degrees of freedom for the teachers for question nine were 42 with an established critical value of 2.419. The calculated critical value, 1.07, of the teachers' scores for survey statement nine did not exceed the established value of 2.419. The differences in the teachers' scores between rounds for statement nine were insignificant.

The administrators' responses to survey statement nine can also be found in Table 10. Round one score results reveal 10 or 53% of those responding agreed with survey statement nine. Almost an equal number, nine or 47% of the administrators in round one disagreed

Table 10. Statement 9. Communication, Construction, Manufacturing, and Transportation.

		SD 1		D 2		A 3		SA 4		$\bar{X}$ Rd. #1 2.6		Calculated Critical
	N	#	%	#	%	#	%	#	%	#	%	Value
Tea. Rd. #1	25	2	8	10	40	9	36	4	16			1.07
Tea. Rd. #2	19	1	5	9	47	6	32	0	0	3	16	
Adm. Rd. #1	19	0	0	9	47	10	53	0	0			1.86
Adm. Rd. #2	14	0	0	10	71.3	2	14.3	0	0	2	14.3	

Critical value for df of 42 = 2.419.
Critical value for df of 31 = 2.453.

with the statement. Round two score results for the administrators reveal two or 14.3% of those responding agreed with the statement. On the other hand, 10 or 71.3% disagreed with the survey statement nine in round two. The mean, 2.6, was also chosen by two or 14.3% of the administrators responding to survey statement number nine in round two. The calculated critical value of the administrators' scores for survey statement nine was 1.86. The degrees of freedom for the administrators for the statement were 31 with an established critical value of 2.453. The calculated critical value, 1.86, did not exceed the established critical value, 2.453, for survey statement nine. The differences in the administrators' scores for both rounds of survey statement nine were insignificant.

The data in Table 11 are in reference to survey statement 10; The industrial arts curriculum currently utilizes concepts found in the state of the art industry and technology. Round one score results of the teachers for survey statement 10 reveal 15 or 63% agreed with the statement. Nine or 37% of the teachers disagreed or strongly disagreed in round one with statement 10. Teacher response to statement 10 in round two reveal seven or 37% agreed with the statement. Also in round two, nine or 47% of the teachers disagreed or strongly disagreed with the statement. Three teachers or 16% of those who responded

chose the mean, 2.7, in round two for survey statement 10. The calculated critical value for the teachers' scores for statement 10 was 1.437. The degrees of freedom for the teachers for this statement were 41 with an established critical value of 2.421. The calculated critical value, 1.437, for the teachers' scores in response to survey statement 10 did not exceed the established critical value, 2.421. The differences between teachers' scores for both rounds in relation to survey statement 10 were insignificant.

Table 11. Statement 10. Utilizes Concepts of Industry and Technology.

		SD 1		D 2		A 3		SA 4		$\bar{X}$ Rd. #1 2.7		Calculated Critical
	N	#	%	#	%	#	%	#	%	#	%	Value
Tea. Rd. #1	24	1	4	8	33	15	63	0	0			1.437
Tea. Rd. #2	19	1	5	8	42	7	37	0	0	3	16	
Adm. Rd. #1	20	0	0	4	20	15	75	1	5			3.30
Adm. Rd. #2	15	1	6.7	9	60	4	26.6	0	0	1	6.7	

Critical value for df of 41 = 2.421.
Critical value for df of 31 = 2.445.

Administrator responses to survey statement 10 can also be found in Table 11. Sixteen or 80% of those responding agreed or strongly agreed with the statement. The remaining four or 20% of the administrators disagreed with the statement in round one. Round two score results to survey statement 10 for the administrators is almost the exact opposite of round one results. Four or 26.6% of those responding in round two agreed with the statement. Opposite to those who agreed in round two were 10 or 66.7% of the administrators who disagreed or strongly disagreed with the statement. Only one or 6.7% of the administrators chose the mean, 2.7, in round two. In this instance, the calculated critical value of statement 10 for the administrators' scores was 3.30. This figure exceeded the established critical value of 2.445 which had been determined by the degrees of freedom

of 33. The differences in the administrators scores between rounds for survey statement 10 were significant.

The data contained in Table 12 are in reference to survey statement 11; The industrial arts teacher uses the latest most sophisticated techniques of instruction as identified by leaders in education and industry. Round one score results for the teachers reveal 15 or 60% agreed or strongly agreed with the statement. Of the other teachers responding, 10 or 40% disagreed or strongly disagreed with survey statement 11 in round one. Round two score results reveal six or 31% percent of the teachers responding agreed with the statement. Also in round two, 10 or 53% of the teachers responding disagreed with the statement. The mean, 2.6, for statement 11 was chosen by three or 16% of the teachers. The calculated critical value of the teachers' scores for statement 11 were 42 with an established critical value of 2.419. The calculated critical value, 1.03, was less than the established critical value, 2.419. The differences in the teachers' scores between rounds for survey statement 11 were insignificant.

Table 12. Statement 11. Techniques Identified by Leaders.

		SD 1		D 2		A 3		SA 4		$\bar{X}$ Rd. #1 2.6		Calculated Critical
	N	#	%	#	%	#	%	#	%	#	%	Value
Tea. Rd. #1	25	2	8	8	32	14	56	1	4			1.03
Tea. Rd. #2	19	0	0	10	53	6	31	0	0	3	16	
Adm. Rd. #1	20	0	0	9	45	11	55	0	0			.564
Adm. Rd. #2	15	1	6.7	6	40	7	46.6	0	0	1	6.7	

Critical value for df of 42 = 2.419.
Critical value for df of 33 = 2.445.

Table 12 also gives the data for the administrators's responses to statement 11. Score results for the administrators' responses for round one reveal 11 or 55% of those responding agreed with the statement. The other nine or 45% of the administrators disagreed with survey statement 11 in round one. Score results of round two reveal seven or 46.6% of the administrators agreed with the statement. Seven or 46.7% of the administrators responding disagreed or strongly disagreed with the statement. Only one, or 6.7% of the administrators responding in round two chose the mean, 2.6, for survey statement 11. The calculated critical value of the administrators' scores for both rounds was .564. The established critical value for the degrees of freedom of 33 was 2.445. The calculated critical value, .564, did not exceed the established critical value, 2.445. The differences between rounds in the administrators' scores for statement 11 were insignificant.

The data in Table 13 are in reference to survey statement 12; The industrial arts teacher maintains current knowledge in the industrial arts field by reading professional and technical publications. Round one score results reveal 23 or 92% of the teachers who responded agreed or strongly agreed with the statement. Only two or 8% of the teachers who responded in round one disagreed with survey statement 12. Round two score results also reveal 14 or 74% of the teachers responding agreed or strongly agreed with the statement. The remaining five or 26% of the teachers chose the mean, 3.0, in round two. The calculated critical value of the teachers' scores for survey statement 12 was .752. The degrees of freedom for the teachers in relation to survey statement 12 were 42 with an established critical value of 2.419. The calculated critical value, .752, did not exceed the established critical value, 2.419, for the teachers' scores for survey statement 12. The differences between the teachers' scores for the statement were insignificant.

Further analysis of the data in Table 13 reveal the administrators' scores for survey statement 12. Round one results of the administrators' scores reveal 15 or 75% of the administrators who responded agreed or strongly agreed with the statement. The remaining

Table 13. Statement 12. Maintains Current Knowledge.

		SD 1		D 2		A 3		SA 4		$\bar{X}$ Rd. #1 3.0		Calculated Critical Value
	N	#	%	#	%	#	%	#	%	#	%	
Tea. Rd. #1	25	0	0	2	8	17	68	6	24			.752
Tea. Rd. #2	19	0	0	0	0	13	69	1	5	5	26	
Adm. Rd. #1	20	0	0	5	25	12	60	3	15			.474
Adm. Rd. #2	15	1	6.7	1	6.7	11	73.3	0	0	2	13.3	

Critical value for df of 42 = 2.419.
Critical value for df of 33 = 2.445.

five or 25% of the administrators who responded in round one disagreed with survey statement 12. Round two score results of the administrators reveal 11 or 73.3% agreed with the statement. Two or 13.3% of the administrators disagreed or strongly disagreed with the statement. Another two or 13.3% of the administrators in round two chose the mean, 3.0, for survey statement 12. The calculated critical value for the administrators' scores for this statement was .474. The degrees of freedom for the administrators in relation to this statement were 33 with an established critical value of 2.445. The calculated critical value, .474, did not exceed the established value, 2.445. The differences between the administrators' scores for both rounds for survey statement 12 were insignificant.

The data in Table 14 are in reference to survey statement 13; The industrial arts teacher obtains interdisciplinary support to assist in achieving program objectives and goals. Round one score results for teacher responses reveal 18 or 72% agreed or strongly agreed with the statement. The remaining teachers, seven or 28% who responded in round one disagreed with survey statement 13. Round two score results reveal 10 or 53% of the teachers agreed or strongly agreed with the statement. Five or 26% of the teachers disagreed with the statement in round two. The remaining teachers, four or 21%, chose the

mean, 2.9, for survey statement 13 in round two. The calculated critical value for the teachers' scores in Table 14 was .524. The degrees of freedom for the teachers for survey statement 13 were 42 with an established critical value of 2.419. The calculated critical value, .524, of the teachers' scores did not exceed the established critical value, 2.419 for for survey statement 13. The differences between the teachers' scores for both rounds were insignificant.

Table 14. Statement 13. Interdisciplinary Support.

		SD 1		D 2		A 3		SA 4		$\bar{X}$ Rd. #1 2.9		Calculated Critical
	N	#	%	#	%	#	%	#	%	#	%	Value
Tea. Rd. #1	25	0	0	7	28	14	56	4	16			.524
Tea. Rd. #2	19	0	0	5	26	8	42	2	11	4	21	
Adm. Rd. #1	20	0	0	5	25	13	65	1	10			1.361
Adm. Rd. #2	15	0	0	6	40	7	46.6	0	0	2	13.3	

Critical value for df of 42 = 2.419.
Critical value for df of 33 = 2.445.

Table 14 also reveals the administrators' scores for survey statement 13. Round one score results reveal 15 or 75% of the administrators agreed or strongly agreed with the statement. Five or 25% of the administrators disagreed with survey statement 13 in round one. Round two score results reveal seven or 46.6% of the administrators agreed with the statement. Of the other administrators who responded, six or 40% disagreed with the statement. The mean, 2.9, was chosen by two or 13.3% of the administrators in round two. The calculated critical value of the administrators' scores was 1.361 for survey statement 13. The degrees of freedom of the administrators for this statement were 33 with an established critical value of 2.445. The calculated critical value, 1.361, was less than the established value, 2.445, for the administrators' scores in relation to survey statement 13. The

differences between the administrators' scores for both rounds were insignificant for this survey statement.

The data in Table 15 are in reference to survey statement 14; The industrial arts teacher provides educational experiences centered around projects and crafts. Round one results for the teachers' scores reveal 24 or 96% of those responding agreed or strongly agreed with the statement. Only one or 4% of the teachers responding in round one disagreed with survey statement 14. The teachers' scores for round two reveal 17 or 89% of those responding agreed or strongly agreed with the statement. Only two or 11% of the teachers responding in round two chose the mean, 3.4. The calculated critical value of the teachers' scores for survey statement 14 was 1.31. The degrees of freedom for the teachers' scores in relation to survey statement 14 were 42 with an established critical value of 2.419. The calculated critical value, 1.31, was less than the established value, 2.419. The differences between the teachers' scores for both rounds were insignificant for statement 14.

Table 15. Statement 14. Experience Around Projects and Crafts.

		SD 1		D 2		A 3		SA 4		$\bar{X}$ Rd. #1 3.4		Calculated Critical Value
	N	#	%	#	%	#	%	#	%	#	%	
Tea. Rd. #1	25	0	0	1	4	14	56	10	40			1.31
Tea. Rd. #2	19	0	0	0	0	7	36	10	53	2	11	
Adm. Rd. #1	20	0	0	1	5	10	50	9	45			.048
Adm. Rd. #2	15	0	0	1	6.7	6	40	4	40	2	13.3	

Critical value for df of 42 = 2.419.
Critical value for df of 33 = 2.445.

Table 15 also reveals the administrators' scores for survey statement 14. Round one score results reveal 19 or 95% of the administrators agreed or strongly agreed with the statement. Only one or 5% of the administrators disagreed with survey statement 14 in

round one. Round two score results reveal 10 or 80% of the administrators agreed or strongly agreed with the statement. Of the other administrators who responded, only one or 6.7% disagreed with the statement. The mean, 3.4, was chosen by two or 13.3% of the administrators in round two. The calculated critical value of the administrators' scores was .048 for survey statement number 14. The degrees of freedom of the administrators for this statement were 33 with an established critical value of 2.445. The calculated critical value, .048, was less than the established value, 2.445, for the administrators' scores in relation to survey statement 14. The differences between the administrators' scores for both rounds were insignificant for this statement.

The data in Table 16 are in reference to survey statement 15; The industrial arts teacher provides educational experiences centered around research and experimentation with products and industries. Round one results for the teachers' scores reveal 11 or 46% of those responding agreed or strongly agreed with the statement. The other teachers' responses reveal 13 or 54% disagreed or strongly disagreed with survey statement 15. The teachers' scores for round two reveal four or 22% of those responding agreed with the statement. Ten or 56% of the teachers disagreed with the statement in round two. Of the remaining teachers responding in round two, four or 22% chose the mean, 2.5. The calculated critical value of the teachers' scores for survey statement 15 was 1.95. The degrees of freedom for the teachers' scores in relation to survey statement 15 were 40 with an established critical value of 2.423. The calculated critical value, 1.95, was less than the established value, 2.423. The differences between the teachers' scores for both rounds were insignificant.

Table 16 also reveal the administrators' scores for survey statement 15. Round one score results reveal nine or 45% of the administrators agreed or strongly agreed with the statement. Eleven or 55% of the administrators disagreed or strongly disagreed with survey

Table 16. Statement 15. Experience Around Research and Experimentation.

		SD 1		D 2		A 3		SA 4		$\bar{X}$ Rd. #1 2.5		Calculated Critical Value
	N	#	%	#	%	#	%	#	%	#	%	
Tea. Rd. #1	24	1	4	12	50	9	38	2	8			1.95
Tea. Rd. #2	18	0	0	10	56	4	22	0	0	4	22	
Adm. Rd. #1	20	1	5	10	50	8	40	1	5			.721
Adm. Rd. #2	15	0	0	10	66.7	4	26.6	0	0	1	6.7	

Critical value for df of 40 = 2.423.
Critical value for df of 33 = 2.445.

statement 15 in round one. Round two score results reveal four or 26.6% of the administrators agreed with the statement. Of the other administrators who responded, 10 or 66.7% disagreed with the statement. The mean, 2.5, was chosen by only one or 6.7% of the administrators in round two. The calculated critical value of the administrators' scores was .721 for survey statement 15. The degrees of freedom of the administrators for this statement were 33 with an established critical value of 2.445. The calculated critical value, .721, was less than the established value, 2.445 for the administrators' scores in relation to survey statement 15. The differences between the administrators' scores for both rounds were insignificant for this survey statement.

The data in Table 17 are in reference to survey statement 16; The industrial arts teacher develops the individual's ability to cope with the requirements of living in a technological era. Round one results for the teachers' scores reveal 21 or 84% of those responding agreed or strongly agreed with the statement. Four or 16% of teachers responding in round one disagreed or strongly disagreed with survey statement 16. The teachers' scores for round two reveal 12 or 63% of those responding agreed with the statement. Of the other teachers who responded, three or 16% disagreed with the statement. Four or 21% of

the teachers responding in round two chose the mean, 2.8. The calculated critical value of the teachers' scores for survey statement 16 was .909. The degrees of freedom for the teachers' scores in relation to survey statement 16 were 42 with an established critical value of 2.419. The calculated critical value, .909 was less than the established value, 2.419. The differences between the teachers' scores for both rounds were insignificant.

Table 17. Statement 16. Cope With the Technological Era.

		SD 1		D 2		A 3		SA 4		$\bar{X}$ Rd. #1 2.8		Calculated Critical
	N	#	%	#	%	#	%	#	%	#	%	Value
Tea. Rd. #1	25	1	4	3	12	16	64	5	20			.909
Tea. Rd. #2	19	0	0	3	16	12	63	0	0	4	21	
Adm. Rd. #1	20	1	5	6	30	12	60	1	5			1.01
Adm. Rd. #2	15	0	0	8	53.3	5	33.3	0	0	2	13.3	

Critical value for df of 42 = 2.419.
Critical value for df of 33 = 2.445.

Table 17 also reveals the administrators' scores for survey statement 16. Round one score results reveal 13 or 65% of the administrators agreed or strongly agreed with the statement. Seven or 35% of the administrators disagreed or strongly disagreed with survey statement 16 in round one. Round two score results reveal five or 33.3% of the administrators who responded agreed with the statement. Eight or 53.3% of the administrators disagreed with the statement. The mean, 2.8, was chosen by two or 13.3% of the administrators in round two. The calculated critical value of the administrators' scores was 1.01 for survey statement 16. The degrees of freedom of the administrators for this statement were 33 with an established critical value of 2.445. The calculated critical value, 1.01, was less than the established value, 2.445, for the administrators' scores in relation to

survey statement 16. The differences between the administrators' scores for both rounds were insignificant for this survey statement.

The data in Table 18 are in reference to survey statement 17; The industrial arts teacher identifies current technological advances. Round one results for the teachers' scores reveal 20 or 80% of the teachers responding agreed or strongly agreed with the statement. Five or 20% of teachers responding in round one disagreed with survey statement 17. The teachers' scores for round two reveal 11 or 58% of those responding agreed with the statement. Only two or 11% of the teachers responding in round two disagreed with the statement. The mean, 2.9, was chosen by six or 31% of the teachers in round two. The calculated critical value of the teachers' scores for survey statement 17 was .662. The degrees of freedom for the teachers' scores in relation to survey statement 17 were 42 with an established critical value of 2.419. The calculated critical value, .662, was less than the established value, 2.419. The differences between the teachers' scores for both rounds were insignificant for this statement.

Table 18. Statement 17. Technological Advances.

		SD 1		D 2		A 3		SA 4		$\bar{X}$ Rd. #1 2.9		Calculated Critical Value
	N	#	%	#	%	#	%	#	%	#	%	
Tea. Rd. #1	25	0	0	5	20	16	64	4	16			.662
Tea. Rd. #2	19	0	0	2	11	11	58	0	0	6	31	
Adm. Rd. #1	20	0	0	5	25	13	65	2	10			1.36
Adm. Rd. #2	15	0	0	6	40	7	46.7	0	0	2	13.3	

Critical value for df of 42 = 2.419.
Critical value for df of 33 = 2.445.

Table 18 also reveals the administrators' scores for survey statement 17. Round one score results reveal 15 or 75% of the administrators agreed or strongly agreed with the

statement. Of the other administrators who responded, six or 40% disagreed with the statement. The mean, 2.9, was chosen by two or 13.3% of the administrators in round two. The calculated critical value of the administrators' scores was 1.36 for survey statement 17. The degrees of freedom of the administrators for this statement were 33 with an established critical value of 2.445. The calculated critical value, 1.36, was less than the established value, 2.445, for the administrators' scores in relation to survey statement 17. The differences between the administrators' scores for both rounds were insignificant for this statement.

The data in Table 19 are in reference to survey statement 18; The industrial arts teacher stresses craftmanship in keeping with industrial arts role in general education. Round one results for the teachers' scores reveal 25 or 100% of those responding agreed or strongly agreed with the statement. The teachers' scores for round two reveal 15 or 79% of those responding agreed or strongly agreed with the statement. Only one or 5% of the teachers who responded in round two disagreed with the statement. Three or 16% of the teachers responding in round two chose the mean, 3.5. The calculated critical value of the teachers' scores for survey statement 18 was .126. The degrees of freedom for the teachers' scores in relation to survey statement 18 were 42 with an established critical value of 2.419. The calculated critical value, .126, was less than the established value, 2.419. The differences between the teachers' scores for both rounds were insignificant for this statement.

Table 19 also reveals the administrators' scores for survey statement 18. Round one score results reveal 19 or 95% of the administrators agreed or strongly agreed with the statement. Only one or 5% of the administrators disagreed with survey statement 18 in round one. Round two score results reveal 12 or 80% of the administrators agreed or strongly agreed with the statement. The remaining three administrators who responded

Table 19. Statement 18. Stresses Craftmanship.

		SD 1		D 2		A 3		SA 4		$\bar{X}$ Rd. #1 3.5		Calculated Critical Value
	N	#	%	#	%	#	%	#	%	#	%	
Tea. Rd. #1	25	0	0	0	0	10	40	15	60			.126
Tea. Rd. #2	19	0	0	1	5	4	21	11	58	3	16	
Adm. Rd. #1	20	0	0	1	5	10	50	9	45			.529
Adm. Rd. #2	15	0	0	0	0	6	40	6	40	3	20	

Critical value for df of 42 = 2.419.
Critical value for df of 33 = 2.445.

strongly agreed with the statement. The remaining three administrators who responded in round two chose the mean, 3.5, for survey statement 18. The calculated critical value of the administrators' scores was .529 for survey statement number 18. The degrees of freedom of the administrators for this statment were 33 with an established critical value of 2.445. The calculated critical value, .529, was less than the established value, 2.445, for the administrators' scores in relation to survey statement 18. The differences between the administrators' scores for both rounds were insignificant for this survey statement.

The data in Table 20 are in reference to survey statement 19; Industrial arts should provide students with manipulative skills that would be of immediate value to an employer. Round one results for the teachers' scores reveal 19 or 76% of those responding agreed or strongly agreed with the statement. Six or 24% of teachers responding in round one disagreed or strongly disagreed with survey statement 19. The teachers' scores for round two reveal 15 or 78% of those responding agreed or strongly agreed with the statement. Another two or 11% disagreed with the statement. Also two or 11% of the teachers responding in round two chose the mean, 3.1. The calculated critical value of the teachers' scores for survey statement 19 was .252. The degrees of freedom for the teachers' scores in relation to survey statement 19 were 42 with an established critical value of 2.419. The calculated

Table 20. Statement 19. Manipulative Skills of Immediate Value.

	N	SD 1 #	%	D 2 #	%	A 3 #	%	SA 4 #	%	$\bar{X}$ Rd. #1 3.1 #	%	Calculated Critical Value
Tea. Rd. #1	25	1	4	5	20	8	32	11	44			.252
Tea. Rd. #2	19	0	0	2	11	9	47	6	31	2	11	
Adm. Rd. #1	20	1	5	3	15	10	50	6	30			.161
Adm. Rd. #2	15	0	0	2	13.3	10	66.7	2	13.3	1	6.7	

Critical value for df of 42 = 2.419.
Critical value for df of 33 = 2.445.

critical value, .252, was less than the established value, 2.419. The differences between the teachers' scores for both rounds were insignificant for this survey statement.

Table 20 also reveals the administrators' scores for survey statement 19. Round one score results reveal 16 or 80% of the administrators agreed or strongly agreed with the statement. Four or 20% of the administrators disagreed or strongly disagreed with survey statement 19 in round one. Round two score results reveal 12 or 80% of the administrators agreed with the statement. Of the other administrators who responded, two or 13.3% disagreed or strongly disagreed with the statement. The mean, 3.1, was chosen by only one or 6.7% of the administrators in round two. The calculated critical value of the administrators' scores was .161 for survey statement number 19. The degrees of freedom of the administrators for this statement were 33 with an established critical value of 2.445. The calculated critical value, .161, was less than the established value, 2.445, for the administrators' scores in relation to survey statement 19. The differences between the administrators' scores for both rounds were insignificant for this survey statement.

The data in Table 21 are in reference to survey statement 20; Industrial arts should provide students with the opportunity to get an education which will prepare them for

employment. Round one results for the teachers' scores reveal 19 or 76% of those responding agreed or strongly agreed with the statement. Six or 24% of teachers responding in round one disagreed or strongly disagreed with survey statement 20. The teachers' scores for round two reveal 13 or 69% of those responding agreed or strongly agreed with the statement. Of the other teachers who responded in round two, five or 26% disagreed with the statement. Only one or 5% of the teachers responding in round two chose the mean, 3.0. The calculated critical value of the teachers' scores for survey statement 20 was .984. The degrees of freedom for the teachers' scores in relation to survey statement 20 were 42 with an established critical value of 2.419. The calculated critical value, .984, was less than the established value, 2.419. The differences between the teachers' scores for both rounds were insignificant for this survey statement.

Table 21. Statement 20. Prepare Them For Employment.

		SD 1		D 2		A 3		SA 4		$\bar{X}$ Rd. #1 3.0		Calculated Critical
	N	#	%	#	%	#	%	#	%	#	%	Value
Tea. Rd. #1	25	1	4	5	20	10	40	9	36			.984
Tea. Rd. #2	19	0	0	5	26	10	53	3	16	1	5	
Adm. Rd. #1	20	1	5	5	25	8	40	6	30			.325
Adm. Rd. #2	15	0	0	2	13.3	11	73.3	0	0	2	13.3	

Critical value for df of 42 = 2.419.
Critical value for df of 33 = 2.445.

Table 21 also reveal the administrators' scores for survey statement 20. Round one score results reveal 14 or 70% of the administrators agreed or strongly agreed with the statement. Six or 30% of the administrators disagreed or strongly disagreed with survey statement 20 in round one. Round two score results reveal 11 or 73.3% of the administrators agreed with the statement. Of the other administrators who responded, two or

13.3% disagreed with the statement. The mean, 3.0, was chosen by two or 13.3% of the administrators in round two. The calculated critical value of the administrators' scores was .325 for survey statement 20. The degrees of freedom of the administrators for this statement were 33 with an established critical value of 2.445. The calculated critical value, .325, was less than the established value, 2.445, for the administrators' scores in relation to survey statement 20. The differences between the administrators' scores for both rounds were insignificant for this survey statement.

The data in Table 22 are in reference to survey statement 21; Industrial arts should provide students with work experience while attending school. Round one results for the teachers' scores reveal 16 or 64% of those responding agreed or strongly agreed with the statement. Nine or 36% of teachers responding in round one disagreed or strongly disagreed with survey statement 21. The teachers' scores for round two reveal nine or 47% of those responding agreed or strongly agreed with the statement. Eight or 42.5% of the teachers responding in round two disagreed or strongly disagreed with survey statement 21. The mean, 2.5, was chosen by two or 10.5% of the teachers responding to this statement in round two. The calculated critical value of the teachers' scores for survey statement 21 was .67. The degrees of freedom for the teachers' scores in relation to survey statement 21 were 42 with an established critical value of 2.419. The calculated critical value, .67, was less than the established value, 2.419. The differences between the teachers' scores for both rounds were insignificant.

Table 22 also reveal the administrators' scores for survey statement 21. Round one score results reveal seven or 35% of the administrators agreed or strongly agreed with the statement. Thirteen or 65% of the administrators disagreed or strongly disagreed with survey statement 21 in round one. Round two score results reveal four or 26.7% of the administrators agreed with the statement. Of the other administrators who responded, nine or 60% disagreed or strongly disagreed with the statement. The mean, 2.5, was chosen by

Table 22. Statement 21. Work Experience.

	N	SD 1 #	%	D 2 #	%	A 3 #	%	SA 4 #	%	$\bar{X}$ Rd. #1 2.5 #	%	Calculated Critical Value
Tea. Rd. #1	25	1	4	8	32	14	56	2	8			.67
Tea. Rd. #2	19	2	10.5	6	32	7	36.5	2	10.5	2	10.5	
Adm. Rd. #1	20	1	5	12	60	5	25	2	10			1.06
Adm. Rd. #2	15	3	20	6	40	4	26.7	0	0	2	13.3	

Critical value for df of 42 = 2.419.
Critical value for df of 33 = 2.445.

two or 13.3% of the administrators in round two. The calculated critical value of the administrators' scores was 1.06 for survey statement 21. The degrees of freedom of the administrators for this statement were 33 with an established critical value of 2.445. The calculated critical value, 1.06, was less than the established value, 2.445, for the administrators' scores in relation to survey statement 21. The differences between the administrators' scores for both rounds were insignificant for this survey statement.

The data in Table 23 are in reference to survey statement 22; Industrial arts should place emphasis upon assisting students in developing insight and understanding of our industrial and technological society. Round one results for the teachers' scores reveal 23 or 96% of those responding agreed or strongly agreed with the statement. Only one or 4% of teachers responding in round one disagreed with survey statement 22. The teachers' scores for round two reveal 15 or 79% of those responding agreed or strongly agreed with the statement. Only two or 10.5% of the teachers responding in round two disagreed with the statement. Also, only two or 10.5% chose the mean, 3.5. The calculated critical value of the teachers' scores for survey statement 22 was .311. The degrees of freedom for the teachers' scores in relation to survey statement 22 were 41 with an established critical

Table 23. Statement 22. Industrial and Technological Society.

	N	SD 1 #	%	D 2 #	%	A 3 #	%	SA 4 #	%	$\bar{X}$ Rd. #1 3.5 #	%	Calculated Critical Value
Tea. Rd. #1	24	0	0	1	4	18	75	5	21			.311
Tea. Rd. #2	19	0	0	2	10.5	12	63	3	16	2	10.5	
Adm. Rd. #1	20	0	0	3	15	11	55	6	30			1.1
Adm. Rd. #2	15	0	0	2	13.3	11	73.3	0	0	2	13.3	

Critical value for df of 41 = 2.421.
Critical value for df of 33 = 2.445.

value of 2.421. The calculated critical value, .311, was less than the established value, 2.421. The differences between the teachers' scores for both rounds were insignificant for this survey statement.

Table 23 also reveal the administrators' scores for survey statement 22. Round one score results reveal 17 or 85% of the administrators agreed or strongly agreed with the statement. Three or 15% of the administrators disagreed with survey statement 22 in round one. Round two score results reveal 11 or 73.3% of the administrators agreed with the statement. Of the other administrators who responded, two or 13.3% disagreed with the statement. The mean, 3.5, was chosen by two or 13.3% of the administrators in round two. The calculated critical value of the administrators' scores was 1.1 for survey statement 22. The degrees of freedom of the administrators for this statement were 33 with an established critical value of 2.445. The calculated critical value, 1.1, was less than the established value, 2.445, for the administrators' scores in relation to survey statement 22. The differences between the administrators' scores for both rounds were insignificant for this survey statement.

The data in Table 24 are in reference to survey statement 23; Industrial arts should maintain goals which are consistent with state and national standards. Round one results for the teachers' scores reveal 20 or 80% of those responding agreed or strongly agreed with the statement. Five or 20% of teachers responding in round one disagreed or strongly disagreed with survey statement 23. The teachers' scores for round two reveal 14 or 74% of those responding agreed or strongly agreed with the statement. Of the other teachers responding in round two, only one or 5% strongly disagreed with the statement. Four or 21% of the teachers responding in round two chose the mean, 3.1. The calculated critical value of the teachers' scores for survey statement 23 was .884. The degrees of freedom for the teachers' scores in relation to survey statement 23 were 42 with an established critical value of 2.419. The calculated critical value, .884, was less than the established value, 2.419. The differences between the teachers' scores for both rounds were insignificant.

Table 24. Statement 23. Goals of State and National Standards.

		SD 1		D 2		A 3		SA 4		$\bar{X}$ Rd. #1 3.1		Calculated Critical
	N	#	%	#	%	#	%	#	%	#	%	Value
Tea. Rd. #1	25	2	8	3	12	16	64	4	16			.884
Tea. Rd. #2	19	1	5	0	0	11	58	3	16	4	21	
Adm. Rd. #	20	0	0	1	5	12	60	7	35			1.62
Adm. Rd. #2	15	0	0	1	6.7	10	66.6	1	6.7	3	20	

Critical value for df of 42 = 2.419.
Critical value for df of 33 = 2.445.

Table 24 also reveal the administrators' scores for survey statement 23. Round one score results reveal 19 or 95% of the administrators agreed or strongly agreed with the statement. Only one or 5% of the administrators disagreed with survey statement 23 in round one. Round two score results reveal 11 or 73.3% of the administrators agreed or

strongly agreed with the statement. Of the other administrators who responded, again only one or 6.7% disagreed with the statement. The mean, 3.1, was chosen by three or 20% of the administrators in round two. The calculated critical value of the administrators' scores was 1.62 for survey statement 23. The degrees of freedom of the administrators for this statement were 33 with an established critical value of 2.445. The calculated critical value, 1.62, was less than the established value, 2.445 for the administrators' scores in relation to survey statement 23. The differences between the administrators' scores for both rounds were insignificant for this survey statement.

The data in Table 25 are in reference to survey statement 24; Industrial arts should incorporate the content of industrial arts with other school subjects. Round one results for the teachers' scores reveal 24 or 96% of those responding agreed or strongly agreed with the statement. Only one or 4% of teachers responding in round one disagreed with survey statement 24. The teachers' scores for round two reveal 12 or 63.5% of those responding agreed or strongly agreed with the statement. Of the other teachers responding in round two, only two or 10.5% disagreed with the statement. Five or 26% of the teachers responding in round two chose the mean, 3.5. The calculated critical value of the teachers' scores for survey statement 24 was 1.164. The degrees of freedom for the teachers' scores in relation to survey statement 24 were 42 with an established critical value of 2.419. The calculated critical value, 1.164, was less than the established value, 2.419. The differences between the teachers' scores for both rounds were insignificant for this survey statement.

Table 25 also reveals the administrators' scores for survey statement 24. Round one score results reveal all 20 or 100% of the administrators agreed or strongly agreed with the statement. Round two score results reveal 10 or 66.6% of the administrators agreed or strongly agreed with the statement. Of the other administrators who responded, three or 20% disagreed or strongly disagreed with the statement. The mean, 3.4, was chosen by two

Table 25. Statement 24. Incorporate with Other Subjects.

	N	SD 1 #	%	D 2 #	%	A 3 #	%	SA 4 #	%	$\bar{X}$ Rd. #1 3.4 #	%	Calculated Critical Value
Tea. Rd. #1	25	0	0	1	4	13	52	11	44			1.164
Tea. Rd. #2	19	0	0	2	10.5	10	53	2	10.5	5	26	
Adm. Rd. #1	20	0	0	0	0	14	70	6	30			1.67
Adm. Rd. #2	15	0	0	3	20	8	53.3	2	13.3	2	13.3	

Critical value for df of 42 = 2.419.
Critical value for df of 33 = 2.445.

or 13.3% of the administrators in round two. The calculated critical value of the administrators' scores was 1.67 for survey statement 24. The degrees of freedom of the administrators for this statement were 33 with an established critical value of 2.445. The calculated critical value, 1.67, was less than the established value, 2.445, for the administrators' scores in relation to survey statement 24. The differences between the administrators' scores for both rounds were insignificant for this survey statement.

The data in Table 26 are in reference to survey statement 25; Industrial arts should stress creative development of student abilities involving material, processes and products of industry. Round one results for the teachers' scores reveal 23 or 92% of those responding agreed or strongly agreed with the statement. Only two or 8% of teachers responding in round one disagreed with survey statement 25. The teachers' scores for round two reveal 14 or 74% of those responding agreed or strongly agreed with the statement. The other five or 26% of the teachers responding in round two chose the mean, 3.3. The calculated critical value of the teachers' scores for survey statement 25 was .185. The degrees of freedom for the teachers' scores in relation to survey statement 25 were 42 with an established critical

Table 26. Statement 25. Creative Development Involving Industry.

	N	SD 1 #	%	D 2 #	%	A 3 #	%	SA 4 #	%	$\bar{X}$ Rd. #1 3.3 #	%	Calculated Critical Value
Tea. Rd. #1	25	0	0	2	0	13	52	10	40			.185
Tea. Rd. #2	19	0	0	0	0	10	53	4	21	5	26	
Adm. Rd. #1	19	0	0	0	0	12	63	7	37			1.56
Adm. Rd. #2	15	0	0	1	6.7	10	66.6	2	13.3	2	13.3	

Critical value for df of 42 = 2.419.
Critical value for df of 32 = 2.449.

value of 2.419. The calculated critical value, .185, was less than the established value, 2.419. The differences between the teachers' scores for both rounds were insignificant.

Table 26 also reveal the administrators' scores for survey statement 25. Round one score results reveal all 19 or 100% of the administrators agreed or strongly agreed with the statement. Round two score results reveal 12 or 79.9% of the administrators agreed or strongly agreed with the statement. Of the other administrators who responded, only one or 6.7% disagreed with the statement. The mean, 3.3, was chosen by two or 13.3% of the administrators in round two. The calculated critical value of the administrators' scores was 1.56 for survey statement number 25. The degrees of freedom of the administrators for this statement were 32 with an established critical value of 2.449. The calculated critical value, 1.56, was less than the established value, 2.449, for the administrators' scores in relation to survey statement 25. The differences between the administrators' scores for both rounds were insignificant for this survey statement.

The data in Table 27 are in reference to survey statement 26; Industrial arts should prepare students for entry into advanced trade and industrial, technical or advanced education programs. Round one results for the teachers' scores reveal 22 or 88% of those

responding agreed or strongly agreed with the statement. Three or 12% of teachers responding in round one disagreed with survey statement 26. The teachers' scores for round two reveal 12 or 63% of those responding agreed or strongly disagreed with the statement. Of the other teachers responding in round two, only two or 11% disagreed with the statement. Five or 26% of the teachers responding in round two chose the mean, 3.2. The calculated critical value of the teachers' scores for survey statement 26 was .428. The degrees of freedom for the teachers' scores in relation to survey statement 26 were 42 with an established critical value of 2.419. The calculated critical value, .428, was less than the established value, 2.419. The differences between the teachers' scores for both rounds were insignificant.

Table 27. Statement 26. Entry Into Advanced Programs.

		SD 1		D 2		A 3		SA 4		$\bar{X}$ Rd. #1 3.2		Calculated Critical
	N	#	%	#	%	#	%	#	%	#	%	Value
Tea. Rd. #1	25	0	0	3	12	13	52	9	36			.428
Tea. Rd. #2	19	0	0	2	11	8	42	4	21	5	26	
Adm. Rd. #1	19	1	5	2	11	11	58	5	26			.385
Adm. Rd. #2	15	1	6.7	1	6.7	10	66.6	2	13.3	1	6.7	

Critical value for df of 42 = 2.419.
Critical value for df of 32 = 2.449.

Table 27 also reveal the administrators' scores for survey statement 26. Round one score results reveal 16 or 84% of the administrators agreed or strongly agreed with the statement. Three or 16% of the administrators disagreed or strongly disagreed with survey statement 26 in round one. Round two score results reveal 12 or 79.9% of the administrators agreed or strongly agreed with the statement. Of the other administrators who responded, only two or 13.4% disagreed or strongly disagreed with the statement. The

mean, 3.2, was chosen by only one or 6.7% of the administrators in round two. The calculated critical value of the administrators' scores was .385 for survey statement 26. The degrees of freedom of the administrators for this statement were 32 with an established critical value of 2.449. The calculated critical value, .385, was less than the established value, 2.449, for the administrators' scores in relation to survey statement 26. The differences between the administrators' scores for both rounds were insignificant for this survey statement.

A review of the instrument found in Appendix B reveals that it was divided into three parts. Statements 1-10 dealt with factors identifying elements of existing curriculums. Statements 11-18 on the instrument were directed at identifying traits of the industrial arts teacher. The last eight statements allowed the respondent to identify his or her view on what the industrial arts curriculum should be. The data found in Tables 28-33 provide information relating to the group scores of the respondents for each section of the instrument.

The data found in Table 28 are in relation to the group scores for statements 1-10. The data reveal the teachers' mean response to statements 1-10 for each round. The t test determined the calculated critical value, .87. The established critical value was 2.419. The calculated critical value, .87, was less than the established critical value, 2.419, for the teachers' responses to statements 1-10. The differences between the teachers' score results in relation to statements 1-10 were insignificant for both rounds.

Table 28. Teachers and Administrators' Response to Statements 1-10.

	N	$\bar{X}$	Calculated Critical Value
Tea. Rd. #1	25	29.82	.87
Tea. Rd. #2	19	29.23	
Adm. Rd. #1	20	29.35	1.899
Adm. Rd. #2	15	27.69	

Critical value for df of 42 = 2.419.
Critical value for df of 33 = 2.445.

Other data found in Table 28 reveal the administrators' mean response to statements 1-10 for each round. The t test determined the calculated critical value, 1.899. The established critical value was 2.445. The calculated critical value, 1.899, was less than the established critical value, 2.445, for the administrators' responses to statements 1-10. The differences between the administrators' score responses in relation to statements 1-10 were insignificant for both rounds.

The data found in Table 29 are in relation to the group scores for statements 11-18. The data reveal the teachers' mean response to statements 11-18 for each round. The t test determined the calculated critical value, 1.15, for the teachers' group response. The established critical value was 2.419. The calculated critical value, 1.15, was less than the established critical value, 2.419, for the teachers' responses to statements 11-18. The differences between the teachers' score results in relation to statements 11-18 were insignificant for both rounds.

Table 29. Teachers and Administrators' Response to Statements 11-18.

	N	$\bar{X}$	Calculated Critical Value
Tea. Rd. #1	25	23.05	1.15
Tea. Rd. #2	19	22.07	
Adm. Rd. #1	20	23.90	.85
Adm. Rd. #2	15	23.30	

Critical value for df of 42 = 2.419.
Critical value for df of 33 = 2.445.

Other data found in Table 29 reveal the administrators' mean response to statements 11-18 for each round. The t test determined the calculated critical value, .85. The established critical value was 2.445. The calculated critical value, .85, was less than the established critical value, 2.445, for the administrators' responses to statements 11-18. The differences between the administrators' score responses in relation to statements 11-18 were insignificant for both rounds.

The data found in Table 30 are in relation to the group scores for statements 19-26. The data reveal the teachers' mean response to statements 19-26 for each round. The t test determined the calculated critical value, .390. The established critical value was 2.419. The calculated critical value, .390, was less than the established critical value, 2.419, for the teachers' responses to statements 19-26. The differences between the teachers' score results in relation to statements 19-26 were insignificant for both rounds.

Table 30. Teachers and Administrators' Response to Statements 19-26.

	N	$\bar{X}$	Calculated Critical Value
Tea. Rd. #1	25	24.74	.390
Tea. Rd. #2	19	24.30	
Adm. Rd. #1	20	24.20	.992
Adm. Rd. #2	15	23.00	

Critical value for df of 42 = 2.419.
Critical value for df of 33 = 2.445.

Other data found in Table 30 reveal the administrators' mean response to statements 19-26 for each round. The t test determined the calculated critical value, .992. The established critical value was 2.445. The calculated critical value, .992, was less than the established critical value, 2.445, for the administrators' responses to statements 19-26. The differences between the administrators' score responses in relation to statements 19-26 for both rounds were insignificant.

The data found in Table 31 are in relation to the group scores for statements 1-10. The data reveal a comparison between the teachers' and administrators' mean response to statements 1-10 for each round. The t test determined the calculated critical value, .577, for round one. The calculated critical value, .577, was less than the established critical value, 2.416, for the responses to statements 1-10 in round one. The differences between the teachers' and administrators' score results in relation to statements 1-10 in round one were insignificant.

Table 31. Comparative Response to Statements 1-10.

	N	$\bar{X}$	Calculated Critical Value
Tea. Rd. #1	25	29.82	.577
Adm. Rd. #1	19	29.23	
Tea. Rd. #2	20	29.35	2.10
Adm. Rd. #2	15	27.69	

Critical value for df of 43 = 2.416.
Critical value for df of 32 = 2.449.

Other data found in Table 31 reveal the teachrs' and administrators' mean response to statements 1-10 for round two. The t test determined a calculated critical value of 2.10. The established critical value was 2.449. The calculated critical value, 2.10, was less than the established critical value, 2.449, for the teachers' and administrators' responses to statements 1-10 in round two. The differences between the teachers' and administrators' score responses in relation to statement 1-10 for round two were insignificant.

The data found in Table 32 are in relation to the group scores for statements 11-18. The data reveal a comparison between the teachers' and administrators' mean response to statements 11-18 for each round. The t test determined a critical value of .957 for round one. The established critical value, .957, was less than the established critical value, 2.416, for the responses to statements 11-18 in round one. The differences between the teachers' and administrators score results in relation to statements 11-18 were insignificant for round one.

Table 32. Comparative Response to Statements 11-18.

	N	$\bar{X}$	Calculated Critical Value
Tea. Rd. #1	25	23.90	.957
Adm. Rd. #1	19	23.30	
Tea. Rd. #2	20	23.05	1.85
Adm. Rd. #2	15	22.07	

Critical value for df of 43 = 2.416.
Critical value for df of 32 = 2.449.

Other data found in Table 32 reveal the teachers' and administrators' mean response to statements 11-18 for round two. The t test determined a calculated critical value of 1.85. The established critical value was 2.449. The calculated critical value, 1.85, was less than the established critical value, 2.449, for the teachers' and administrators' responses to statements 11-18 in round two. The differences between the teachers' and administrators' score responses in relation to statements 11-18 were insignificant in round two.

Table 33. Comparative Response to Statements 19-26.

	N	$\bar{X}$	Calculated Critical Value
Tea. Rd. #1	25	24.74	.466
Adm. Rd. #1	19	24.30	
Tea. Rd. #2	20	24.20	1.83
Adm. Rd. #2	15	23.00	

Critical value for df of 43 = 2.416.
Critical value for df of 32 = 2.449.

The data found in Table 33 are in relation to the group scores for statements 19-26. The data reveal a comparison between the teachers' and administrators' mean response to statements 19-26 for each round. The t test determined a calculated critical value of .466 for round one. The established critical value was 2.416 for round one. The calculated critical value, .466, was less than the established critical value, 2,416, for the responses to statements 19-26 in round one. The differences in the teachers' and administrators' score results in relation to statements 19-26 were insignificant in round one.

Other data found in Table 33 reveal the teachers' and administrators' mean response to statements 19-26 for round two. The t test determined a calculated critical value of 1.83 for round two scores. The established critical value was 2.449. The calculated critical value, 1.83, was less than the established critical value, 2.449, for the teachers' and administrators' responses to statements 19-26 round two. The differences between the teachers'

and administrators' score responses in relation to statements 19-26 were insignificant in round two.

CHAPTER 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The purpose of this study was to identify if the role which technology plays in industrial arts had been identified in rural public secondary schools in Montana. Specific objectives for this study were:

1. Determine if there are any state of the art rural technological based industrial arts programs in public secondary schools in Montana.
2. Determine the attitude of rural industrial arts teachers and administrators in Montana toward state of the art industrial programs.
3. Determine the need for implementing state of the art technological based industrial arts programs.

Information gathered from the review of the literature indicated that industrial arts leaders throughout the nation are calling for the adoption of technology based industrial arts programs. The current trend in education indicates that educational systems are lacking in their approach to technology education. There is an understanding or belief that technology education can aid the decision-making ability of students. Leaders in industrial arts education indicate there is a definite need for the presentation of technology in today's industrial arts programs.

A modified Delphi technique was used in the study. The 26 statements which provided for the makeup of the instrument for the Delphi were adopted from three existing studies. The instrument was initially reviewed for its construct validity by professional

personnel. A list of possible rural industrial arts teachers who could participate in the study were identified from the *1984-1985 Directory of Industrial Education Personnel.* Possible administrators who were eligible to participate were identified from the *Directory of Montana Schools: 1984-1985.* The initial study sample size was comprised of sixty individuals, thirty teachers and thirty administrators, who were mailed round one of the instrument. Round two of the instrument was mailed to those who responded to round one. Round two differed from round one in that the participants had the opportunity to choose the mean which was computed from round one scores. Upon completion of round two, a t test was conducted on the data. The calculated critical value of the participants' scores was compared to the established critical value. The degrees of freedom and the level of significance, .05, designated the established critical value.

Conclusions

Upon reviewing the results of the survey some conclusions might be drawn. It can be concluded that at the time of the study, teachers and administrators placed a major emphasis on industrial arts programs which were project oriented and placed emphasis on craftmanship.

A second conclusion was that some technological based education is taking place in some industrial arts programs at the time of the study.

A third conclusion which can be drawn is the fact that there was little group consensus for the statements relating to the study.

A fourth conclusion in relation to the results of the survey indicates that differences between the teachers and administrators' perception of the role of industrial arts in their schools varied little from school to school.

Recommendations

In review of the findings and conclusions drawn from this study, the researcher offers the following recommendations:

1. Recommendation – Teachers and administrators review literature regarding current trends in industrial arts in the nation.
2. Recommendation – The goals of local rural industrial arts programs be continually evaluated to determine if the needs of the students and society are being met.
3. Recommendation – That further research to identify those aspects of technology education which could be instituted in industrial arts programs be continued.
4. Recommendation – That a study to perceive the role which the 1985 Montana Industrial Arts Planning Guide plays in industrial arts curriculum development in rural schools be done.
5. Recommendation – Continued efforts involving industrial arts program development toward state of the art curriculum be intensified.

BIBLIOGRAPHY

BIBLIOGRAPHY

Annison, M. H., Industrial Arts/Technology Education: An Opportunity to Change. 1983. *The Technology Teacher 43*(1), 4.

Bender, M., Technology Education and Traditional Industrial Arts. 1982. *Epsilson Pi Tau 8*(2): 57-64.

Boyer, E. (1983). *High School: A Report on Secondary Education in America*. New York: Harper & Row.

Board of Directors, *Thirty-Second Annual* Official Handbook of the Montana High School Association. 1984-1985 (pp. 96-97).

Calhoun, C., & Finch, A., *Vocational Education: Concepts and Operations*. 1982. (2nd ed.). California: Wadsworth.

Devore, P., Technology—Its Impact on Industrial Arts. May 1975. 29.

Devore, P., Technology and Community Development. 1984. *The Technology Teacher 44*(1): 4-7.

Downie, N., & Heath, R. (1965). *Basic Statistical Methods*. (2nd ed., pp. 139-221). New York: Harper & Row.

Edgar, R. W., Setting the Future Agenda. 1984. *The Technology Teacher 44*(1): 4-7.

Ferguson, G. (1981). *Statistical Analysis in Psychology and Education*. (5th ed., pp. 163-166). New York: McGraw-Hill.

Gorton, R. A. (1984). *School Administration and Supervision*. (p. 26). Iowa: Brown.

Grannis, G. E., High Technology in Industrial Arts: Who Provides the Leadership. 1984. *The Technology Teacher 43*(4): 2.

Hacker, M., A. Future-Oriented, Globally Based Curriculum Model for Industrial Technology. 1982. *Man Society Technology 42*(1): 3-4.

Hales, J., & Synder, J., (Editors). *Jackson's Mill Industrial Arts Curriculum Theory*. 1980. 1-42.

Hales, J., and Synder, J., Jackson's Mill Industrial Arts Curriculum Theory: A Base for Curriculum Conception. 1982. *Man Society Technology 41*(6): 6.

Heyer, R. C., Technology Society, and You; An Instructional Unit for the Study of Technology and Culture. 1983. *Man Society Technology 42*(2):23-24.

Hostrop, R.W. (1973). *Managing Education for Results.* Homewood, IC: ETC Publications.

Jacobs, J., & Ritz, J., Materials and Processes Technology: A Foundation for Technology Education. 1981. *Epsilon Pi Tau 7*(2): 29-32.

Kohl, J. W., & Others, Information Technology: Its Impact on and Implication for Education in Montana. A Critical Issues Paper. 1983. 2-11.

Kozak, M. R., The Evolving Profession. 1982. *Epsilon Pi Tau 8*(1): 57-60.

LaPorte, J., Thoughts on Why We Haven't Changed. 1982. *Epsilon Pi Tau 8*(92): 77.

Lauda, D. P., Three Scenarios on the Technology Education Base. 1983. *Epsilon Pi Tau 9*(2): 9.

Lauda, D. P., What To Do About Technology: The Industrial Arts Educator's Responsibility. 1979. *Epsilon Pi Tau 5*(1): 29.

Lauda, D. P., Technology Education and Closing the Gap Between Theory and Practice. 1984. *The Technology Teacher 43*(6): 3-4.

McNeil, J. (1985). *Curriculum: A Comprehensive Introduction.* (3rd ed., pp. 3-380). Massachusetts: Little & Brown.

Owen, D. (1962). *Handbook of Statistical Tables* (pp. 27-31). Massachusetts: Addison-Wesley.

Pytlik, E. C., Technology Education and Human Values: A Course for High School Students. 1981. *Epsilon Pi Tau 7*(2): 37.

Starkweather, K. (1979). G. Eugene Martin (Editor), *Industrial Arts Education: Retrospect, Prospect. 28th Yearbook.* Ohio: Oxford.

Southern Illinois University, Carbondale. College of Education, Preparing Students to Adapt With the New Technology. 1983. 15-16.

Trump, J., & Miller, D. (1977). Industrial Arts. Louis Rubin (Editor), *Curriculum Handbook: The Discipline, Current Movements, and Instructional Methodology* (pp. 250-263). Massachusetts: Allyn & Bacon.

Vockell, E. (1983). *Educational Research* (pp. 217-225). New York: Macmillan.

Weaver, W., The Delphi Forecasting Method. 1971. *Phi Delta Kappan 52*(5): 67-71.

Wright, T. E., Symposium III Proceedings (Muncie, Indiana, Oct. 23, 1981). 9.

Wright, J. R., Technology Literacy: A Primary Goal for Industrial Arts Teacher Education. 1980. *Epsilon Pi Tau 6*(2): 35-37.

APPENDICES

APPENDIX A

STUDY PARTICIPANTS

STUDY PARTICIPANTS

Mr. James Johnson
IA Teacher
Alberton High School
Alberton, MT 59820

Mr. Gayle Clark
IA Teacher
Mad. Va. Cons. High School
Ennis, MT 59729

Mr. Bernard Sethaler
IA Teacher
Grass Range High School
Grass Range, MT 59032

Mr. Charles Pilling
IA Teacher
Hays-Lodge Pole High School
Hays, MT 59527

Mr. Dave Herdina
IA Teacher
Joplin-inverness High School
Joplin, MT 59531

Mr. John Darnell
IA Teacher
Lincoln High School
Lincoln, MT 59639

Mr. Jess Frampton
IA Teacher
Noxon High School
Noxon, MT 59853

Mr. Larry Viess
IA Teacher
Granite High School
Philipsburg, MT 59858

Mr. Howard Conquergood
IA Teacher
Blue Sky High School
Rudyard, MT 59540

Mr. Dale Thom
IA Teacher
Dodson High School
Dodson, MT 59524

Mr. Jerry Murphy
IA Teacher
Gardiner High School
Gardiner, MT 59030

Mr. Donny Farris
IA Teacher
Highwood High School
Highwood, MT 59450

Mr. Scott Brown
IA Teacher
Hot Springs High School
Hot Springs, MT 59845

Mr. John Masonovich
IA Teacher
Lambert High School
Lambert, MT 59243

Mr. Dick Kline
IA Teacher
Nashua High School
Nashua, MT 59248

Mr. Bruce Wallace
IA Teacher
Peerless High School
Peerless, MT 59253

Mr. Don McClaine
IA Teacher
Roy High School
Roy, MT 59471

Mr. Dennis Latimer
IA Teacher
Ryegate High School
Ryegate, MT 59074

Mr. Dwight Freeman
IA Teacher
Saco High School
Saco, MT 59261

Mr. Norman Krause
IA Teacher
Savage High School
Savage, MT 59262

Mr. Lyle Swenson
IA Teacher
Terry High School
Terry, MT 59349

Mr. Vince Forsman
IA Teacher
WSS High School
White Sulphur Springs, MT 59645

Mr. Jeff Salisbury
IA Teacher
Wilsall High School
Wilsall, MT 59086

Mr. Tom Leik
IA Teacher
Drummond High School
Drummond, MT 59832

Ms. Regina Marvin
Administrative Assistant
Alberton High School
Alberton, MT 59820

Mr. Jay Willett
Principal
Mad. Va. Cons. High School
Ennis, MT 59729

Mr. James Shehein
Superintendent
Flaxville High School
Flaxville, MT 59222

Mr. Jesse Kibbee
IA Teacher
Centerville High School
Sand Coulee, MT 59472

Mr. Ken DeVries
IA Teacher
Sunburst High School
Sunburst, MT 59482

Mr. Russel Samuelson
IA Teacher
Westby High School
Westby, MT 59275

Mr. Steve Hagg
IA Teacher
Whitewater High School
Whitewater, MT 59544

Mr. William Lodermeier
IA Teacher
Winnett High School
Winnett, MT 59087

Mr. Wayne Erfle
IA Teacher
Rapelje High School
Rapelje, MT 59067

Mr. James Webster
Principal
Charlo High School
Charlo, MT 59824

Mr. Ric Floren
Superintendent
Dodson High School
Dodson, MT 59524

Mr. Lynn Mavencamp
Superintendent
Gardiner High School
Gardiner, MT 59030

Mr. Richard Dengel
Superintendent
Grass Range High School
Grass Range, MT 59032

Mr. Elmer Main
Superintendent
Hays-Lodge Pole High School
Hays, MT 59527

Ms. Patricia Price
Superintendent
Judith Gap High School
Judith Gap, MT 59453

Mr. Joe Fahn
Superintendent
J-I High School
Joplin, MT 59531

Mr. John Baule
Superintendent
Garfield Co. High School
Jordan, MT 59337

Mr. Richard Hughes
Superintendent
Moore High School
Moore, MT 59464

Mr. Duane Scott
Superintendent
Noxon High School
Noxon, MT 59853

Mr. Larry Lehman
Superintendent
Power High School
Power, MT 59468

Mr. Ron Marshall
Superintendent
Roberts High School
Roberts, MT 59070

Mr. Paul Preeshl
Superintendent
K-G High School
Gilford, MT 59525

Mr. Dennis Williams
Superintendent
Highwood High School
Highwood, MT 59450

Mr. Dan Haugen
Superintendent
Lambert High School
Lambert, MT 59243

Ms. Susan Jensen
Principal
Lima High School
Lima, MT 59739

Mr. Terry Loveland
Superintendent
Lincoln High School
LIncoln, MT 59639

Mr. Robert Barnes
Superintendent
Nashua High School
Nashua, MT 59248

Mr. Ed Zabrocki
Superintendent
Peerless High School
Peerless, MT 59253

Mr. Robert Klein
Superintendent
Reedpoint High School
Reedpoint, MT 59069

Mr. James Smith
Principal
Blue Sky High School
Rudyard, MT 59540

Mr. Alan Ryan
Superintendent
Sunburst High School
Sunburst, MT 59482

Mr. Glenn Sorenson
Superintendent
West Yellowstone High School
West Yellowstone, MT 59758

Mr. James Kelly
Principal
White Sulphur Springs High School
White Sulphur Springs, MT 59645

Mr. Thomas Nau
Principal
Sunburst High School
Sunburst, MT 59482

Mr. Ivan Hernandez
Superintendent
Victor High School
Victor, MT 59875

Mr. Roger Britton
Superintendent
Whitewater High School
Whitewater, MT 59544

APPENDIX B

COVER LETTER, SAMPLE SURVEY, AND PARTICIPANTS

Montana State University
Bozeman, Montana 59717

Department of Agricultural and Industrial Education
College of Agriculture

March 10, 1985

Scott E. Davis
Ag.& Ind. Ed. Dept.
Cheever Hall
Montana State University
Bozeman, MT 59717

Dear Participant;

Education in the United States has recently undergone close inspection by public and private individuals and/or groups. Results of those studies have concluded that certain aspects of the educational process must change in order to meet societal needs of the future. The expansion of knowledge and technical developments indicates that what is taught in schools today may not be applicable tomorrow.

As a graduate student at Montana State University, I am currently conducting a survey on the existence of technology education in rural schools in Montana. Industrial educaton programs teach technical developments of society. The effect of these developments on society, technology education and its concepts, also needs to be taught.

The enclosed survey was developed by reviewing instruments which were identified as representing state-of-the-art industrial education programs nationwide. Statements on the instrument are aimed at ascertaining: 1. what is currently taught in industrial education programs; 2. what should be taught.

I would greatly appreciate your comments in relation to the above two points. Indicate changes you feel appropriate by crossing out words; writing additional comments in the space provided or on the back of the questionnaire. Enclosed you will find a self-addressed stamped envelope for returning the instrument. Thank you for your help and cooperation.

Yours truly,

Scott E. Davis
Graduate Teaching Assistant
Ag. & Ind. Education

Telephone (406) 994-3201
Ambassador Powerline Brusweiside Route: Wheatley
(406) 994-3691
Bishop Shelhamer

DIRECTIONS; Rate the following statements as to your perception of the industrial arts program in your school and your philosophy of industrial arts. Circle the appropriate number.

SD--1--strongly disagree with statement
D---2--disagree with statement
A---3--agree with statement
SA--4--strongly agree with statement

	SA	A	D	SD
The industrial arts curriculum currently;				
1. places emphasis on craftsmanship in laboratory projects	4	3	2	1
2. incorporates basic academic skills	4	3	2	1
3. places more emphasis on planning than on executing projects	4	3	2	1
4. increases student's ability to synthesize and understand the broad spectrum of technological society	4	3	2	1
5. develops product producing experiences along with supportive skills and technical knowledge	4	3	2	1
6. provides instruction to help students understand the technology of their geographic area	4	3	2	1
7. has problem solving as a key component in each instructional area	4	3	2	1
8. develops students ability to use tools, materials, and processes to solve technical problems	4	3	2	1
9. is offered in the broad categories of communication, construction, manufacturing, and transportation	4	3	2	1
10. utilizes concepts found in state of the art industry and technology	4	3	2	1
The industrial arts teacher;				
11. uses the latest, most sophisticated techniques of instruction as identified by leaders in education and industry	4	3	2	1
12. maintains current knowledge in the industrial arts field by reading professional and technical publications	4	3	2	1
13. obtains interdisciplinary support to assist in achieving program objectives and goals	4	3	2	1
14. provides educational experiences centered around projects and crafts	4	3	2	1
15. provides educational experiences centered around research and experimentation with products and industries	4	3	2	1
16. develops the individual's ability to cope with the requirements of living in a technological era	4	3	2	1
17. identifies current technological advances	4	3	2	1
18. stresses craftsmanship in keeping with industrial arts role in general education	4	3	2	1
Industrial arts should;				
19. provide students with manipulative skills that would be of immediate value to an employer	4	3	2	1
20. provide students with the opportunity to get an education which will prepare them for employment	4	3	2	1
21. provide students with work experience while attending school	4	3	2	1
22. places emphasis upon assisting students in developing insight and understanding of our industrial and technological society	4	3	2	1
23. maintain goals which are consistent with state, and national standards	4	3	2	1
24. incorporate the content of industrial arts with other school subjects	4	3	2	1
25. stress creative development of student abilities involving material, processes and products of industry	4	3	2	1
26. prepare students for entry into advanced trade and industrial, technical or advanced education programs	4	3	2	1

Other relevant comments;

_____

_____

_____

_____

_____

_____

_____

PARTICIPANTS

Mr. Tony Kelsey
IA Teacher
Broadview High School
Broadview, MT 59015

Mr. Jeff Hungerford
IA Teacher
West Yellowstone High School
West Yellowstone, MT 59758

Mr. Allyn Larsen
IA Teacher
Wibaux High School
Wibaux, MT 59353

Mr. Gerald Sowden
Superintendent
Hot Springs High School
Hot Springs, MT 59845

Mr. Daniel Nelson
Superintendent
Terry High School
Terry, MT 59349

Mr. Van Shelhamer
Ag. & Ind. Ed. Dept.
Montana State University
Bozeman, MT 59717

Dr. Max Amberson
Ag. & Ind. Ed. Dept.
Montana State University
Bozeman, MT 59717

Dr. Jerry Roiter
Ag. & Ind. Ed. Dept.
Montana State University
Bozeman, MT 59717

David Agnew
Ag. & Ind. Ed. Dept.
Montana State University
Bozeman, MT 59717

Mr. Earl Furlong
IA Teacher
Geraldine High School
Geraldine, MT 59446

Mr. Pat McLinden
IA Teacher
Richey High School
Richey, MT 59259

Mr. Stanley Perkins
Superintendent
Broadview Public School
Broadview, MT 59015

Mr. Richard Kuka
Principal
Centerville High School
Sand Coulee, MT 59472

Mr. Phil Waber
Superintendent
Twin Bridges High School
Twin Bridges, MT 59754

Dr. Doug Polette
Ag. & Ind. Ed. Dept.
Montana State University
Bozeman, MT 59717

Dr. Ken Bruwelheide
Ag. & Ind. Ed. Dept.
Montana State University
Bozeman, MT 59717

Dr. Douglas Bishop
Ag. & Ind. Ed. Dept.
Montana State University
Bozeman, MT 59717

Jere Wheatley
Ag. & Ind. Ed. Dept.
Montana State University
Bozeman, MT 59717

APPENDIX C

COVER LETTER AND ROUND ONE

Montana State University
Bozeman, Montana 59717

Department of Agricultural and Industrial Education
College of Agriculture

March 29, 1985

Scott E. Davis
Ag. & Ind. Ed.
Cheever Hall
Montana State University
Bozeman, MT 59717

Dear Participant:

Education in the United States is at a crucial point in time. Knowledge available continually expands and dictates changes in society. Technology education provides an opportunity for students to review changes in society and understand these changes. Education in Montana must change to meet the needs of students for the future.

As a graduate student in industrial arts at Montana State University, I am conducting a survey to gain an understanding of the the use of technology education in rural industrial arts programs. The process used to ascertain the necessary information is the Delphi Technique. This technique involves a gaining of consensus by recognized individuals of the educational system. I would like your help and cooperation to gain the necessary information. Two mailings of the instrument will occur. The first mailing identifies your initial response to the statements. The second mailing of the instrument will includes a mean rating of each statement by the total population. The second mailing will give you a chance to evaluate the consensus rating as well as allow you to change your initial response if you wish. The first mailing is included with this cover letter. I would greatly appreciate your help in completing and mailing back the instrument by April 9, 1985.

Sincerely,

Scott E. Davis
Graduate Teaching Assistant
Ag. & Ind. Education

Telephone (406) 994-3201
Amberson Palette Bruvenheide Rorie Wheatley
(406) 994-3691
Bishop Shoemaker

DIRECTIONS; Rate the following statements as to your perception of the industrial arts program in your school and your philosophy of industrial arts. Circle the appropriate number.

SD--1--strongly disagree with statement
D---2--disagree with statement
A---3--agree with statement
SA--4--strongly agree with statement

	SA	A	D	SD
The industrial arts curriculum currently;				
1. places emphasis on craftsmanship in laboratory projects	4	3	2	1
2. incorporates basic academic skills	4	3	2	1
3. places more emphasis on planning than on executing projects	4	3	2	1
4. increases student's ability to synthesize and understand the broad spectrum of technological society	4	3	2	1
5. develops product producing experiences along with supportive skills and technical knowledge	4	3	2	1
6. provides instruction to help students understand the technology of their geographic area	4	3	2	1
7. has problem solving as a key component in each instructional area	4	3	2	1
8. develops students ability to use tools, materials, and processes to solve technical problems	4	3	2	1
9. is offered in the broad categories of communication, construction, manufacturing, and transportation	4	3	2	1
10. utilizes concepts found in state of the art industry and technology	4	3	2	1
The industrial arts teacher;				
11. uses the latest, most sophisticated techniques of instruction as identified by leaders in education and industry	4	3	2	1
12. maintains current knowledge in the industrial arts field by reading professional and technical publications	4	3	2	1
13. obtains interdisciplinary support to assist in achieving program objectives and goals	4	3	2	1
14. provides educational experiences centered around projects and crafts	4	3	2	1
15. provides educational experiences centered around research and experimentation with products and industries	4	3	2	1
16. develops the individual's ability to cope with the requirements of living in a technological era	4	3	2	1
17. identifies current technological advances	4	3	2	1
18. stresses craftmanship in keeping with industrial arts role in general education	4	3	2	1
Industrial arts should;				
19. provide students with manipulative skills that would be of immediate value to an employer	4	3	2	1
20. provide students with the opportunity to get an education which will prepare them for employment	4	3	2	1
21. provide students with work experience while attending school	4	3	2	1
22. places emphasis upon assisting students in developing insight and understanding of our industrial and technological society	4	3	2	1
23. maintain goals which are consistent with state, and national standards	4	3	2	1
24. incorporate the content of industrial arts with other school subjects	4	3	2	1
25. stress creative development of student abilities involving material, processes and products of industry	4	3	2	1
26. prepare students for entry into advanced trade and industrial, technical or advanced education programs	4	3	2	1

Other relevant comments;

_____

_____

_____

_____

_____

_____

_____

APPENDIX D

COVER LETTER AND ROUND TWO

Montana State University
Bozeman, Montana 59717

Department of Agricultural and Industrial Education
College of Agriculture

April 19, 1985

Scott E. Davis
Ag. & Ind. Ed. Dept.
Cheever Hall
Montana State University
Bozeman, MT 59717

Dear Participant;

In early April you completed round one of this Delphi study. I appreciate your time, effort and responsiveness that went towards the completing of the instrument.

Enclosed with this letter you will find round two of the study. This, the final round of the Delphi study will allow you to agree or disagree with the mean response to each statement. The mean of each statement of round one can be found in the extreme right hand column of round two. Select a response from one of the four columns or circle the mean . It would be appreciated if round two was mailed back to me by May 6, 1985. Thank you for your help and participation in this Delphi study.

Yours truly,

Scott E. Davis
Grad. Teaching Assistant
Ag. & Ind. Education

Telephone (406) 994-3201
Ambassador Poiette Bruyneheide Roter Wheatley
(406) 994-3691
Bishop Shelhamer

Round 2 Rural Industrial Arts Programs

Directions: Round two of this Delphi study allows the participant to chose from any of the five categories. You may circle one of the five options.

4--SA--Strongly Agree
3--A---Agree
2--D---Disagree
1--SD--Strongly Disagree
Mean---Agree With Group Consensus

The industrial arts curriculum currently;	SA	A	D	SD	MEAN
1. places emphasis on craftsmanship in laboratory projects	4	3	2	1	3.5
2. incorporates basic academic skills	4	3	2	1	3.4
3. places more emphasis on planning than on executing projects	4	3	2	1	2.5
4. increases student's ability to synthesize and understand the broad spectrum of technological society	4	3	2	1	2.8
5. develops product producing experiences along with supportive skills and technical knowledge	4	3	2	1	3.1
6. provides instruction to help students understand the technology of their geographic area	4	3	2	1	2.5
7. has problem solving as a key component in each instructional area	4	3	2	1	2.9
8. develops students ability to use tools, materials, and processes to solve technical problems	4	3	2	1	3.5
9. is offered in the broad categories of communication, construction, manufacturing, and transportation	4	3	2	1	2.6
10. utilizes concepts found in state of the art industry and technology	4	3	2	1	2.7
The industrial arts teacher;					
11. uses the latest, most sophisticated techniques of instruction as identified by leaders in education and industry	4	3	2	1	2.6
12. maintains current knowledge in the industrial arts field by reading professional and technical publications	4	3	2	1	3.0
13. obtains interdisciplinary support to assist in achieving program objectives and goals	4	3	2	1	2.9
14. provides educational experiences centered around projects and crafts	4	3	2	1	3.4
15. provides educational experiences centered around research and experimentation with products and industries	4	3	2	1	2.5
16. develops the individual's ability to cope with the requirements of living in a technological era	4	3	2	1	2.8
17. identifies current technological advances	4	3	2	1	2.9
18. stresses craftmanship in keeping with industrial arts role in general education	4	3	2	1	3.5
Industrial arts should;					
19. provide students with manipulative skills that would be of immediate value to an employer	4	3	2	1	3.1
20. provide students with the opportunity to get an education which will prepare them for employment	4	3	2	1	3.0
21. provide students with work experience while attending school	4	3	2	1	2.5
22. places emphasis upon assisting students in developing insight and understanding of our industrial and technological society	4	3	2	1	3.5
23. maintain goals which are consistent with state, and national standards	4	3	2	1	3.1
24. incorporate the content of industrial arts with other school subjects	4	3	2	1	3.4
25. stress creative development of student abilities involving material, processes and products of industry	4	3	2	1	3.3
26. prepare students for entry into advanced trade and industrial, technical or advanced education programs	4	3	2	1	3.2

Other relevant comments;

_____

_____