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Program design models in industrial arts teacher education and certification : a national status study.

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PROGRAM DESIGN MODELS IN INDUSTRIAL ARTS TEACHER EDUCATION AND CERTIFICATION

-A NATIONAL STATUS STUDY-

A Dissertation Presented

by

Robert C. Andrews

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PREFACE AND ACKNOWLEDGEMENTS

This study is intended to provide a comprehensive overview of the contemporary status of industrial arts education in teacher preparation and certification. The results should provide encouragement to others in the field to become involved in concerted efforts of research, review, and renewal of practical and technological education, designed to assist youth as they enter an increasingly complex society.

Sincere appreciation is expressed to the members of my dissertation committee including the chairman, Dr. Kenneth Ertel who provided the direction for the study, and members, Dr. W. C. Wolf, Jr. for his suggestions, and Dr. Anthony Butterfield for his encouragement.

The researcher is also indebted to many administrators, faculty colleagues and staff of Keene State College. Dr. Richard Gustafson, Vice President for Academic Affairs, generously supported my work with a sabbatical semester including financial, computer, printing and postage services. Colleagues Delmar Ogg, and Susan and Harold Nugent competently served as proof readers and Brenda Phillips provided excellent word-processing assistance. Without question, these people helped bring one rather lengthy doctoral acquisition process to closure.

For a stable home life, gratitude is expressed to Emily, my wife of almost twenty-five years and three fine sons, Michael, David and Peter. Their patience, encouragement, and support did more to motivate the completion of this oft-postponed project than they may realize.

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-A NATIONAL STATUS STUDY-

May, 1984

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Purpose of the Study

The purpose of this study was to determine, on a national basis, the structural nature of industrial arts teacher education programs and certification standards, by type and extent; compare the resultant data on the basis of individual states in order to assess the level of programmatic similarity; and assess the degree of collaborative interaction between teacher-education institutions and state certification agencies involved in the process of program review and revision.

Methodology

A descriptive research methodology was employed to gather and report the data of the study. In the first phase, documents were collected from almost 200 teacher education institutions and 50 state departments and indexed and analyzed in order to establish the state-of-the-art in program design model utilization. Next, questionnaires were sent to 200 collegiate department chairpersons and 50 state consultants of industrial arts for two reasons: first, to validate the documented data; and second, to obtain further information about change and consultation activities on a national basis.

Results

The results of the study, based on a Phase I documentation response of 96.8% coupled with an 88.4% response from the Phase II survey, provided quantitative data regarding the utilization of traditional, transitional, and technological program design models in industrial arts teacher education and certification; information concerning recent and projected programmatic revisions; and an indication of the frequency of consultative activity within and between the two population sub-groups under study.

Conclusions

Based on the results of the research, it was concluded: (1) that approximately half of the teacher education and certification programs still employ traditional subjects of industrial arts while categorizing areas within contemporary technological clusters; (2) that a majority of teacher educators are continually involved in the process of updating and adding courses, especially in the areas of computers, robotics, and technological literacy; (3) that the existence of consultation on matters of program review and renewal is very limited within and between teacher education and certification population sub-groups; and (4) that the lack of a unified conceptual framework may be detrimental to the long-term development of industrial arts on a national scale.

CHAPTER I

ORIENTATION TO THE STUDY

Introduction to the Problem

Contemporary industrial arts education, a direct descendant of sloyd, manual training and manual arts, experienced birth and initial growth during the early years of the twentieth century. Its evolution as a viable subject area progressed through three major periods of development. According to Paul DeVore (1968), those periods are sequenced:

> ...on a continuum from courses based on a craft or trade approach devoted to vocational or occupational goals with emphasis on skill development, through programs concentrating on the study of the production elements of industry indigenous to the United States, to programs evolved from the concept of man as the creator of technology, incorporating the fundamental technical and cultural elements of the several areas of technology. (p. 2)

The first phase, characterized by its emphasis on crafts and trades, provided project-oriented coursework in the traditional separate subjects of Woodworking, Metalworking, Drafting, Graphic Arts, Electricity-Electronics, and Power Mechanics. During the fifties, the emphasis was redirected toward process-oriented, contemporary industrial production, which focused on some combination of five basic industries including Communications, Construction, Manufacturing, Power and Energy, and Transportation. Most recently, technical advances pose a third alternative model, offering problem-centered approaches in the three technological clusters of Materials and Processes, Graphic Communications, and Energy and Power.

Nearly thirty years have passed since the earliest curriculum revision efforts in industrial arts education. Research by Schmitt (1961), Schmitt and Pelley (1966), Rudisill (1969), and Chaplin (1974) characterized the contemporary status of industrial arts education. Studies by Betts (1974) and Yoshio (1975) chronicled programmatic and pedagogic experimentations in a relatively large number of curriculum alternatives. More recently, research by Carrel (1978) focused on further refinements in the field.

While Maley, Lux and Ray, Olson, Face and Flug, Kirby, DeVore and others proposed and promoted a series of program options for consideration, acceptance of program innovations on a national scale was marginal. In recent research, Dugger (1980) found that there had been little dramatic change in the national status of curriculum design in industrial arts during the previous twenty year period. Had curriculum theorists outdistanced teachers in an attempt to bring sophistication to industrial arts?

One possible answer to the question was expressed by Goodlad (1975).

> Unfortunately, much of what was developed and diffused turned out to be answers in search of problems. Practitioners perceived their problems differently and, frequently, did not see these answers, however elegantly packaged, as relevant. (p. 16).

Lux (1976), disenchanted by the lack of change in curriculum design, placed the blame for inaction squarely on teacher education.

> There are many widespread shortcomings and inadequacies in industrial arts teacher education. These problems will not be satisfactorily

> ameliorated by adding on to trade-based programs selected courses in manufacturing, construction or communications for example. We do not now possess the expertise which is required to cope with the problems which confront us.
>
> Since the overwhelming part of teacher education faculties are now products of a handicraft-based program, much effort needs to be devoted to inservice seminars, conferences and training sessions which communicate basic industrial technology knowledge and skills. (pp. 110-111)

As a result of this and similar accusations, the researcher sensed a need for a state-of-the-art study of industrial arts teacher education and certification. Teacher education curricula and state certification standards are but two parts of a national network of program design model users. This investigation, therefore, assesses and clarifies the status of program design model utilization, recent and projected revisions, and results of the programmatic change process on a national scale.

Purposes and Objectives

Generally, this study was concerned with the organismic structure of industrial arts programs in the United States. Its purpose was to establish the contemporary nature of delivery system design (undergraduate teacher-education programs) and licensing agency expectations (state certification standards). In addition, the extent of a programmatic metamorphosis was determined, and the results were compared on a state-by-state basis.

Specific objectives of the study included the following:

1. To determine, on a national basis, the structural nature of industrial arts curricula in undergraduate teacher education programs, by type and extent.
2. To determine, on a national basis, the structural nature of industrial arts certification standards in state education department programs, by type and extent.
3. To compare the resultant data on the basis of individual states in order to assess the level of programmatic similarity, and
4. To establish the degree of collaborative action between teacher-education institutions and state certification agencies in the process of program review and revision.

Delimitations

The scope of this study was bounded by the following data parameters in (1) Document Data--which included the collection and categorization of program design information contained in almost 200 college catalogs and/or curriculum pamphlets and fifty state certification bulletins; and (2) Survey Data--which included questionnaire responses from each of the two population sub-groups of two hundred collegiate department chairpersons of industrial arts teacher education and fifty education consultants of industrial arts from across the nation.

All conclusions were limited to the data as presented in college catalogs, certification bulletins, and questionnaire responses and are only generalizeable to the two populations included in the study.

Significance

The results of this comprehensive nation-wide study establishes:

1. A programmatic state-of-the-art description of state, regional, and national emphases in industrial arts teacher education curricula and certification standards.
2. An up-to-date data base for curriculum planners concerned with current design-model utilization and a projection of trends.
3. An estimate of professional collaboration within and between the two population sub-groups included in the study.
4. And, when considered with similar studies, another periodic measure of progress in the continuous development and refinement of industrial arts education.

Terminology

Curriculum Model. The basic structural organization underlying a program of studies.

Industrial Arts. Depending on the historical period, definitions of industrial arts have been refined and restated to keep pace with evolving theory and practice. These are presented in Chapter II.

Industrial Arts Curriculum Models. While many variations exist, for purposes of this study, four basic designs were considered:

(1) Separate Subjects - a traditional subject-centered organization of course offerings, usually including Drafting, Woodworking, Metal-working, Graphic Arts, Mechanics, Electricity, Electronics, and Plastics. (2) Transitional Clusters of Separate Subjects - a fused curriculum wherein related traditional subjects are clustered into Communications, Construction, Manufacturing, Power and Energy, and Transportation Industries. (3) Transitional Clusters of Traditional and Cluster-Oriented Courses - basically the same as the previous model, but with the addition of innovative, cluster-oriented courses with titles similar to Communications, Construction, etc.
(4) Technology Clusters - an alternative organization of cluster-oriented, non-traditional subjects into clusters of Graphic Communications, Materials and Processes, and Energy and Power Technologies.

Innovative Program. Contemporary approaches to industrial arts courses and programs that were developed during the sixties. Those providing the greatest influence on programmatic renewal that received varying degrees of national attention for updating the field of study are included in Chapter II.

Inter-agency Articulation. Collaboration concerning program review and revision between members of the two population sub-groups included in the study.

Intra-agency Articulation. Collaboration concerning program review and revision between members of the same population sub-group.

CHAPTER II

LITERATURE REVIEW AND RELATED RESEARCH

The first section, Historical Background, provides a comprehensive overview of curriculum development in industrial arts education. It is divided into three time frames:

Craft-based Traditional Programs--which include early attempts at defining the subject area;

Industry-based Transitional Programs--which provide a review of innovative programmatic departures founded on an industrial base; and

Technology-based Cluster Programs--which offer the most current expression of trends in technologically-based groupings of cluster-oriented subject matter.

The second section, The Changing Status of Industrial Arts, provides a chronological compilation of text excerpts, dissertation research results, and conclusions of investigative studies that directly relate to the research questions of this study.

Historical Background

Craft-based Traditional Programs

In the early years of manual or industrial education, occupations, crafts and materials provided the bases for project-centered learning. A separate-subjects curriculum design provided the familiar "shops" of woods, metals, drafting, graphic arts, power mechanics, and crafts, which of late, has given way to plastics. The industrial economy was

based on goods producing activities, and early industrial arts programs followed suit with a similar theme.

This central purpose was reflected in the first important definition of industrial arts as proposed by Frederick Bonser and Lois Mossman of Columbia University's Teachers College (1923). They stated that:

> The industrial arts are those occupations by which changes are made in the forms of materials to increase their value for human usage. As a subject for educative purposes, industrial arts is a study of the changes made by man in the forms of materials to increase their values, and of the problems of life related to those changes. (p. 15)

Bonser had been presenting this concept to his classes in elementary teacher education for a decade, but this pronouncement gave the movement a central idea around which to focus activities. Such was the mission of industrial arts during those fledgling years, and students did, in fact, become involved in altering the shapes of natural materials into useful objects of value. Little attention, however, was directed toward explaining the problems of life associated with, or resulting from, those changes in the material culture.

William Warner (1928), in one of his early research efforts, provided the profession with a comprehensive list of fifteen objectives, toward which teachers could direct their programs.

A. Exploration.
B. Educational guidance.
C. Vocational guidance.
D. Consumer knowledge and appreciation.
E. Household mechanics.
F. Social Habits and attitudes.
G. Pre-vocational purposes.
H. Avocational purposes.

I. A degree of skill.
J. The Seven Cardinal Principles.
K. Mechanical intelligence.
L. Correlation with other subjects.
M. Developing the faculties.
N. Coordinating the hand and eye.
O. Vocational training. (p. 34)

These objectives failed to receive acceptance by a jury of experts and a group of Ohio teachers. While some of the fifteen seemed appropriate for junior high school programs, others in the list were more acceptable for high schools. Regardless, the compilation constituted a first attempt at providing a unified direction for industrial arts programs.

Another definition for the traditional industrial arts program was stated by the Western Arts Association (1933), which provided a rather comprehensive look at the growing program.

> Industrial arts is one of the practical arts, a form of general or non-vocational education, which provides learners with experiences, understandings, and appreciations of materials, tools, processes, products, and of the vocational conditions and requirements incident generally to the manufacturing and mechanical industries.
>
> The results are achieved through design and construction of useful products in laboratories and shops, appropriately staffed and equipped, supplemented by readings, investigations, discussions, films, visits, reports, and similar activities characteristic of youthful interests and aptitudes in things industrial.
>
> The subject of industrial arts belongs peculiarly within junior and senior high school areas for such purposes as exploration, guidance, the development of avocational and vocational interest and aptitudes, specific manual abilities, desirable personal-social traits growing out of industrial experiences, ability to choose and use industrial products wisely, all coupled with the

> aesthetic relationships involved. In general, its purposes are educationally social rather than vocationally economic, although in the senior high school it may increasingly emphasize vocational objectives in a non-legal sense, for certain students.
>
> Industrial arts includes such industrial representations as drawing and design, metal work, wood work, textiles, printing, ceramics, automotives, foods, electricity, and similar units, either as separate offerings or in various combinations common to the "general shop" or Laboratory of Industries. (p. 27)

In an effort to refine Warner's list of objectives, the U.S. Office of Education (1937) provided separate lists for the two main levels of schooling being served by industrial arts. For the junior high school, industrial arts:

1. Provides information regarding industry and workers.
2. Reveals employment opportunities offered by industry.
3. Satisfies the boy's and girl's desire to create useful things.
4. Develops hobby and handyman interests and abilities.
5. Contributes to the tastes and judgment of the propective consumer.
6. Develops interest and ability in home repairs and maintenance.
7. Affords practice in safety related to the school, home, and industry.
8. Gives opportunity for cooperative effort in groups.
9. Illustrates and vitalizes academic subjects.

In the senior high school, industrial arts also:

1. Develops an appreciation of design and quality in manufactured products.
2. Provides practice in the use of materials and tools for recreation and home utilization.
3. Samples a variety of industries, through advanced school courses, in preparation for entrance as a beginner into the skilled trades or into college courses in engineering or architecture. (p. 41, 61)

The turbulent years of World War II directed all forms of practical education toward the training of skilled workers in support of the war effort. Global conflict gave birth to industrial giants and the in-school training of manpower was considered a matter of national urgency, if not a patriotic duty.

With the armistice, though, industry was forced to retool in domestic directions for the production of consumer goods. Coincidentally, public education returned the skills-training emphasis to the private sector and redirected its efforts once again to general education concerns. It was in those years that philosopher-practitioners of industrial arts such as Warner, Ericson, and Wilber, prescribed curriculum refinements that were designed to refocus the crafts and trades emphasis on industrial production as the new basis for content selection and methodology. Their visions, however, were ahead of the times and general acceptance of the proposals went unrealized for years. The traditional program had been successful for over a quarter of a century and few teachers saw need for such a change.

Industries-based Transitional Programs

Like other disciplines offered in American schools during the 1950s, industrial arts had fallen out of step with the times. Scientific and technological innovations made it practically and economically impossible for schools to keep up with the pace and amount of change. As a result, more curriculum revision appeared on the scene in the 1960s than had previously occurred in the history of

the movement. Similarly, many curriculum refinements occurred in mathematics, sciences, the social sciences and humanities.

One of the first proposals was presented in an address to the American Industrial Arts Association by William Warner (1947). In "A Curriculum to Reflect Technology," the separate subjects of industrial arts were fused into the clusters of Manufacturing, Communication, Construction, Energy and Power, and Transportation, modeled after the major industries of the day. This new structure for subject matter in industrial arts, while immediately praised as a giant step forward, actually found little general acceptance on a national scale. Regardless, this unique effort laid the foundation for the curriculum innovations which followed during the 1960s.

Gordon Wilber (1948), another leader in the field, offered a redefinition of industrial arts as:

> ...those phases of general education that deal with industry--its evolution, organization, materials, occupations, processes, and products--and with the problems resulting from the industrial and technological nature of society. (p. 2)

Radical departures in curriculum design and definition were promoted, a transitional period was ushered in, and types of industries provided the foundation upon which to build programmatic alternatives. Learning in laboratories became process centered and the activity emphasis changed from the production of goods to the production of services.

Wilber (1948) also prescribed a set of objectives to match his new definition. Industrial arts activities were designed:

1. To explore industry and American industrial civilization in terms of its organization, raw materials, processes and operations, products, and occupations.
2. To develop recreational and avocational activities in the area of constructive work.
3. To increase an appreciation for good craftsmanship and design, both in the products of modern industry and in artifacts from the material cultures of the past.
4. To increase consumer knowledges to a point where students can select, buy, use, and maintain the products of industry intelligently.
5. To provide information about, and insofar as possible, experiences in, the basic processes of many industries, in order that students may be more competent to choose a future vocation.
6. To encourage creative expression in terms of industrial materials.
7. To develop desirable social relationships, such as cooperation, tolerance, leadership and "followership," and tact.
8. To develop safe working practices.
9. To develop a certain amount of skill in a number of basic industrial processes. (pp. 42-43)

The American Vocational Association (AVA), considering industrial arts courses as prerequisites to its programmatic offerings, proposed a similar set of objectives in its "Guide to Improving Instruction in Industrial Arts" (1953).

1. INTEREST IN INDUSTRY. To develop in each pupil an active interest in industrial life and in the methods and problems of production and exchange.
2. APPRECIATION AND USE. To develop in each pupil the appreciation of good design and workmanship and the ability to select, care for, and use industrial products wisely.
3. SELF REALIZATION AND INITIATIVE. To develop in each pupil the habits of self-reliance and resourcefulness in meeting practical situations.
4. COOPERATIVE ATTITUDES. To develop in each pupil a readiness to assist others and to join happily in group undertakings.
5. HEALTH AND SAFETY. To develop in each pupil desirable attitudes and practices with respect to health and safety.

6. INTEREST IN ACHIEVEMENT. To develop in each pupil a feeling of pride in his ability to do useful things and to develop worthy leisure-time interests.
7. ORDERLY PERFORMANCE. To develop in each pupil the habit of an orderly, complete, and efficient performance of any task.
8. DRAWING AND DESIGN. To develop in each pupil an understanding of drawings and the ability to express ideas by means of drawing.
9. SHOP SKILLS AND KNOWLEDGE. To develop in each pupil a measure of skill in the use of common tools and machines and an understanding of the problems involved in common types of construction and repair. (p. 18)

The philosophical change in emphasis occurring during this transitional period provided the impetus to develop a number of programmatic innovations as attempts to fulfill this restated mission. In the middle 1950s at the University of Maryland, Donald Maley (1973b) redefined industrial arts as a study of industry and technology, commonly known as the Maryland Plan. Designed primarily to acquaint the student with the technological advancements of the industrialized culture, the seventh grade program titled The Anthropological Approach traced the historical evolution of tools and machines, power and energy, and communication and transportation. A contemporary study of industry was the center of interest for the eighth grade program, and group activities offered opportunities for team projects and line production. In the ninth grade, students continued the program with advanced study of contemporary technological developments. Discovery learning was of paramount importance and a unit concerning Research and Experimentation was designed for students of high ability, above-average intelligence, and exceptional creativity.

Soon thereafter, Delmar Olson (1957) established six major functions of industrial arts in secondary education.

> THE ORIENTATION FUNCTION - orientation to the industrial society by exploration of tools, materials, processes, products and occupations.
>
> THE TECHNICAL FUNCTION - opportunity to develop specialized interests which may develop into occupational possibilities.
>
> THE AVOCATIONAL FUNCTION - cultivation of a wide variety of useful, wholesome, and enduring leisure-time interests and activities.
>
> THE CONSUMER FUNCTION - development of intelligent attitudes and understandings concerning the selection and use of the products of industry.
>
> THE SOCIAL FUNCTION - development of desirable social attitudes or habits.
>
> THE CULTURAL FUNCTION - development and use of the material inheritance of an involved technological society. (pp. 77-78)

In a pattern quite similar to those used by Wilber and the AVA, Charles Shoemaker (1959) expressed the following objectives in a teacher education yearbook:

1. To help each student understand American industry.
2. To present consumer education so that each student may select, purchase, use properly, and maintain the products of industry.
3. To develop the wise use of leisure in constructive pursuits and to enjoy the satisfaction derived from useful creativity.
4. To help each student understand the world of work and himself with aims of realistic selection of occupational choice.
5. To encourage each student to think through problems, plan procedures for solutions, test conclusions, and make recommendations.
6. To develop personal-social qualities through democratic practices in the shop or laboratory.
7. To develop safe work habits and concern for the safety of others, to follow sound principles of mental and physical health, and to recognize the importance of maintaining a balance of leisure and work.
8. To develop an aesthetic appreciation for creative ability and to practice aesthetic values in daily

living with reference to form, color, texture, design, styling and function.

9. To develop skills in the use of tools, equipment, and materials in a technological age. (pp. 19-33)

While attending a USOE-sponsored conference, a number of prominent professionals attempted to unify the lists of similar objectives and statements of definitions. The proceedings, reported in a booklet entitled "Improving Industrial Arts Teaching" (1960), included four new definitions for the instructional area in addition to an abbreviated compilation of goals for industrial arts in the 1960s.

One of the participants, Ivan Hostetler, defined industrial arts education as:

> ...a laboratory-classroom experience, designed to orient students to our technological culture. Problem solving through analysis, planning, designing, production, and evaluation is the basis for laboratory activities. Analysis of industrial occupations, cultural patterns, the nature of planning and engineering as a problem-solving technique, tool design and use, and the nature of materials, provide the basis for classroom study and field trips. (pp. 19, 65)

Delmar Olson provided his guiding interpretation of industrial arts as:

> ...a study of technology, its origins and development; its technical, consumer, occupational, recreational, social, and cultural nature; and its influences through experimenting, creating, designing, inventing, constructing, and operating with industrial materials, processes, and products. Its purposes are to acquaint the student with his technological environment and to aid him in the discovery and development of his own human potential. (pp. 23, 66)

In addition, Marshall Schmitt, the USOE Specialist for industrial arts, stated:

> ...industrial arts is a curriculum area in the public schools which provides the setting for pupils to learn about industry--the user of science--and to experience the act of creating from materials, new and different forms which have human value. In so doing, students are able to understand and be sensitive to materials, processes, operations, machines, tools, mass production, opportunity for work, quality of products and services, maintenance, safety, and the significance of technology and its effect on society and on the individuals within that society. (pp. 30,65)

The fourth explanation was offered by G. Wesley Ketchum, who noted that industrial arts:

> ...is that part of a total educational program for all youth which is concerned with the development of a practical understanding and appreciation of today's industrial and technical society. Opportunities for learning are provided through experience in planning, using tools and materials, performing processes in the production of useful articles, servicing industrial products, and experimenting in activities related to the science of industrial and technical problems of the world today. (pp. 45, 65)

As a summary interpretation of the many previous listings of objectives for industrial arts, the conference participants offered four general goals.

1. To develop in each student an insight and understanding of industry and its place in our culture.
2. To discover and develop talents of students in the technical fields and applied sciences.
3. To develop technical problem-solving skills related to materials and processes.
4. To develop in each student a measure of skill in the use of common tools and machines. (pp. 19-20)

In the next few years, a number of attempts were made at restructuring industrial arts activities to more closely resemble ongoing

industrial enterprises. Many programs incorporated elaborate administrative and personnel organizations, promoting insights into the most intricate operations of a contemporary industry.

The American Industry Project (1963) at the University of Wisconsin-Stout received initial support from the USOE, followed by subsequent grants from the Ford Foundation and the USOE. The program, originated by Wesley Face and Eugene Flug, sought to assist students in understanding basic industrial concepts, of which thirteen were identified as the basis for subject matter. These major themes included Marketing, Management, Production, Materials, Processes, Energy, Communications, Transportation, Finance, Property, Research, Procurement, and Relationships, which were clustered within an environment of government, public interest, competition, private property, and natural resources. The comprehensive, conceptual framework of the American Industry Project established it as one of the outstanding curriculum development constructs of the 1960s.

In 1965, two other major curriculum revision projects were initiated. At Wisconsin State University-Platteville, Jack Kirby's Industriology project (1968) attempted to supplement, revise and modify traditional industrial arts rather than replace current programs. The Industriology program was unique in that if offered a six-year continuum of activities in four general phases. The first phase--Development and Structure of Industry, was planned for junior high school students. It provided information and activities related to Raw Materials or Extractive Industries, Manufacturing Industries,

Distribution Industries, and Service Industries. In the second phase, Basic Elements and Processes of Industry, high school students became involved in the basic industrial activities of (1) development and design, (2) purchasing, (3) processing, (4) industrial relations, (5) finance and office services, and (6) marketing. Traditional subject areas of industrial arts provided the content and activities for the third phase, Modern Industries. Phase four, Vocational and Occupational Guidance, provided experiences which would ease the transition from school to work. As with the other programmatic innovations, instructional materials were developed to assist teachers and students in the implementation of the program.

Coincidentally, a joint effort was initiated at the Ohio State University and the University of Illinois. Following the provisions of the 1963 Vocational Education Act, Donald Lux, Willis Ray, Edward Towers, and Jacob Stern submitted a proposal for the Industrial Arts Curriculum Project (IACP) to the U.S. Office of Education. As reported by the American Industrial Arts Association (1969), research and development of the program began during 1965 with representatives from business, industry, education and labor assisting in the formulation of the philosophical rationale and the structure for subject matter and activities. The IACP, due perhaps to its fully-developed set of texts, guides, lab manuals, and project materials, became the most significant industrial arts curriculum innovation of the 1960s. In addition, a nationwide series of inservice workshops for tradition-bound industrial arts teachers influenced a redefinition and updating

of standard subject offerings in junior high schools. A series of one-year programs, The World of Construction (1970) and The World of Manufacturing (1971), were the products of the IACP effort which, over the years, found more general acceptance than any other program alternative in industrial arts.

In 1968, Ronald Stadt at Southern Illinois University in Carbondale proposed Enterprise: Man and Technology, as another attempt to simulate the operation of businesses and industries. Following an introductory experience in planning, financing, organizing, staffing, controlling, testing and operating a productive industrial enterprise, students participated in advanced learning activities involving visual communications, materials and processes, electronics and instrumentation, energy conversion and power transmission. Since the late 1960s, a number of industrial arts programs have offered courses or units of instruction using "Enterprise" as the title of their experiments.

A final goals statement of this transitional phase in industrial arts curriculum development was offered by the American Vocational Association (1968). Five major goals were delineated, which were combinations of more lengthy listings previously quoted:

> GOAL I: Develop an insight and understanding of industry and its place in our culture.
> GOAL II: Discover and develop talents, aptitudes, interests, and potentialities of individuals for the technical pursuits and applied sciences.
> GOAL III: Develop an understanding of industrial processes and the practical application of scientific principles.

> GOAL IV: Develop basic skills in the proper use of common industrial tools, machines and processes.
> GOAL V: Develop problem-solving and creative abilities involving the materials, processes, and products of industry. (pp. 9-11)

If a comparison is made between this list and the one developed by the AVA fifteen years earlier, a greater emphasis was now placed on industrial organization, processes and problems, while attention to the details of manual skills and orderly performance was lessened.

Technology-based Cluster Programs

Before the end of the decade of transition, a few creative intellectuals in the discipline made attempts at establishing yet another base upon which to build industrial arts curriculum. Where traditionalists had embraced crafts, occupations, materials and projects as their programmatic foci, and transitionalists had designed a number of curriculum innovations based on industrial production and processing, the technologists provided a universal and flexible foundation, affording opportunities for experimentation, problem solving, analysis, and synthesis. An uncertain technological future was ahead and neither tool skills nor production processes would be appropriate in the indefinable tomorrow. Glen Haas, Kimball Wiles, and Joseph Bondi (1970) captured such thoughts when they considered the curriculum for today's youth who were about to enter productive life in tomorrow's world. They noted:

> Today's curriculum planners should study conditions and trends in contemporary society and probable conditions and requirements for democratic living in the last half of this century. It may be we are planning to educate children for a society

> that does not now exist. Education for the immediate future in our rapidly changing society is almost useless unless it prepares learners to meet problems that are new and that neither they nor anyone else has ever encountered before. (p. 419)

In an attempt to define a new industrial arts for the 1970s and beyond, Donald Maley (1973a) restated a more comprehensive version of Gordon Wilber's definition as:

> ...those phases of general education that deal with technology--its evolution, utilization and significance; with industry--its organization, materials, occupations, processes and products; and with the problems and benefits resulting from the technological and industrial nature of society. (pp. 2-3)

The new curriculum foundation, technology, allowed for problem-centered learning and Maley proposed a high school program designed to explore the applications of technology to the solution of major socio-technical problems. He called for interdisciplinary cooperation within the school and cited such major issues for program implementation as pollution, power generation, housing, transportation, communication, conservation, efficient resource usage, waste disposal, and industrial productivity. To Maley, these seemed most appropriate for study in secondary school industrial arts.

At SUNY-Oswego and West Virginia University, Paul DeVore (1968) attempted another route to radical reconstruction of industrial arts. Regarding the necessity for reassessment:

> In today's world, when there is greater need than ever before for technological literacy, we discover the contemporary status of industrial arts to be one of confusion and perhaps indecision, with a few notable exceptions. (p. 1)

Resulting from his dissatisfaction with the state-of-the-art, he developed a curriculum foundation based on technology as an academic discipline.

> A taxonometric structure for the study of man and technology...identifies three areas of technological endeavor. These areas represent the essence of the discipline, are consistent with major components in other technological classifications and provide for internal adaptability to change through the use of non-transient terms. The technical areas are:
> 1. Production--providing goods and services of economic value for man's needs and wants.
> 2. Communication--providing information dissemination, storage, retrieval and use.
> 3. Transportation--providing movement of men, materials, products and services.
>
> The technological areas of production, communication and transportation are found in all cultures regardless of their stage of development. (p. 12)

So as not to confuse the three areas of technology with the industrial cluster areas presented in a number of transitional alternatives, DeVore offered the following rationale:

> It is proposed that an industrial arts curriculum be based upon the study of man and technology...for the following reasons: A study of man and technology:
>
> 1. provides a better base from which to implement the purposes and objectives of general education;
> 2. is not limited or isolated by geographical boundaries, thereby evidencing the true nature of disciplined inquiry;
> 3. is concerned with man as the creator of technology regardless of national origin;
> 4. provides a meaningful relation between technology and man's culture. Historical, anthropological, social and economic elements of the culture are important to the understanding of man's technology, and a knowledge of

man's technology is vital to the understanding of any culture; and

5. identifies a knowledge area meeting the criterion of a discipline in the truest sense of the term. (p. 2)

The most forward-looking programs, then, adopted a problem-as-project orientation for their developmental activities and technology became the foundation for curriculum.

As the 1970s progressed, a number of political and economic forces substantially influenced the direction and pace of change. Regardless, a structure of conceptual clustering remains to this day wherein industrial arts subject areas are conveniently and philosophically arranged. Visual Communications, Materials and Processes, and Energy and Power had become the contemporary divisions of industrial arts. In such a framework, traditional, transitional and technological curricula coexisted for the benefit of the students being served.

The Changing Status of Industrial Arts

Over the years, a limited number of studies have assessed the status of industrial arts as a curriculum area in the American school system. The first major survey of importance was conducted by Marshall Schmitt (1961), who was the United States Office of Education Specialist for Industrial Arts at the time. The format for the study involved the collection and analysis of curriculum guides from thirty-nine states, providing the profession with its first compilation of empirical data concerning facilities, teachers, student populations, and suggested courses of study. Without question, the survey results

noted the primacy of the traditional separate subjects course offerings in industrial arts.

Heilman (1963), as a result of doctoral research, designed and recommended a national curriculum for the preparation of industrial arts teachers. From his descriptive survey, he concluded a number of standards regarding credit-hour minimums for degree fulfillment and proportional percentages for general education, professional development, and technical studies. In addition, a comparison was made between the curriculum proposal and existing certification standards. Considerable variation was found on a national basis which provided the impetus for a recommendation of greater uniformity, as teacher mobility was increasing substantially.

In a second major national study, Schmitt, with Pelley (1966), reported very little change in curriculum. Industrial arts course offerings were still concentrated in the three subject areas of woodworking, drafting and metalworking, just as they had been since the days of its European antecedents. Although Schmitt's two surveys were conducted during the 1960s, which was known as the decade of programmatic experimentaton, little evidence was found to indicate a shift toward class activities related to contemporary industry and technology. Tool skills and project construction remained the major focus for laboratory activities.

Industrial arts leaders had long since accepted and professed new definitions of their discipline. In addition, lists of goals had been subjected to careful scrutiny, reordering and restatement. Practitioners in the field, however, seemed completely unaware of, or chose

to ignore, nationally stated missions. The innovative programs attempted to establish a unity of purpose but the change process was relatively ineffective on a national scale.

Rudisill (1969), in his analysis of industrial arts teacher education, found but a single change in the terminology from former studies associated with the profession. The word "technology" had been added to a number of traditional course titles. New technical subjects were reported from only five institutions of the 202 included in the survey. Among five conclusions were two that related somewhat to this study.

> The basic curriculum structure in industrial arts has not changed substantially in the past seventy-five years. The existing structure continues to emphasize broad occupational areas rather than major components of industry or technology.
>
> There is a need for clarification and standardization of technical terminology in industrial arts teacher education, as applied to new course classifications.

In the early seventies, Chaplin (1974) concluded a national survey of industrial arts teacher education programs that was jointly sponsored by three national professional organizations. The resulting Task Force Report concentrated on administrative details, personnel, budgets, and facilities, also included items concerned with the academic preparation of future teachers. The study reconfirmed the emphasis on traditional subject areas of Drafting, Woodworking and Metalworking, however, an expanding number of institutions were beginning to offer limited coursework in Power, Construction, Manufacturing, Materials and Processes, Communication and Transportation. Many

others anticipated the development of such industries-based courses in the near future.

Coincidentally, Trump and Miller (1973) cited the lack of a unified direction for the curriculum in their comprehensive text, Secondary School Curriculum Improvement:

> Studies of curriculum guides for industrial arts in the various states reveal a diversity of programs which run the gamut from almost complete obsolescence to sparkling modernity. (p. 142)

> From a perusal of the available curriculum materials, it is reasonable to conclude that industrial arts in the hinterlands has not progressed very far from the concept of teaching basic hand tools and machine processes. Too often, the making of the "take home project" is the ultimate objective. Most industrial arts curriculums need reorganization, both in their concepts and in their objectives. (p. 143)

Apparently, a full spectrum of course offerings was present at the time. The traditional subjects were still very popular while innovative teachers were experimenting with many types of new programmatic alternatives. The text also offered positive recommendations.

> If the proposals for an industrial arts curriculum based on technology are incorporated into the comprehensive secondary school program, industrial arts will undoubtedly take on a new image. Its position in general education will be solidified and its integration with other subject matter areas will be axiomatic. It will necessitate retraining of teachers and the opening of the industrial arts curriculum to the entire school. (p. 151)

> Industrial arts can make a real contribution to the secondary comprehensive school program. The opportunity is present for the development of an industrial arts program that will be vital in the lives of secondary school youth. Courage and vision on the part of industrial arts leaders can open many new vistas in the field. (p. 155)

Dissertation research concerning the implementation of twenty selected innovative programs in industrial arts teacher education institutions led Betts (1974) to conclude that there had not been extensive utilization of the programs. Instead, exposure to the various alternatives was predominant, rather than a working knowledge with which future teachers could confidently implement the programs upon graduation. The only exception to this was the Industrial Arts Curriculum Project, with 55% of the surveyed institutions reporting in-depth preparation. In addition, he noted substantial interest in implementing a number of the available programs, especially after anticipated restructuring of teacher education curricula by combining related traditional technical subjects into Materials and Processes, Graphic Communications, and Power and Energy clusters.

In an attempt to determine future directions of industrial teacher education, Yoshio (1975) stated a number of conclusions of which four are directly related to this study. Expressed were program diversity within a stable structure, support for national certification standards, and a forecast of programmatic trends:

> ...there are many different designs for industrial arts education, especially in respect to content and methodology.
>
> The basic teacher education structure for industrial arts has not substantially changed since its inception. (p. 36)
>
> Regardless of the regional educational system, there is strong support to establish a nation-wide system of teacher certification.
>
> ...programs will become more concept-based...with emphasis on concepts rather than materials and tools. (pp. 37-38)

In a 1977 survey of forty-six member colleges in the Mississippi Valley Industrial Teacher Education Conference, Carrel (1978) found that thirty institutions utilized a traditional program model, thirteen indicated use of a cluster curriculum model and three employed a traditional structure while offering a very limited number of cluster courses. Names of clusters were specified as:

> (1) Manufacturing and Construction, Materials and Processes, Production
> (2) Communication, Graphic Communication, Visual Communication
> (3) Energy and Power, Power and Transportation, Power
>
> It appears that the names being used to identify the major categories (i.e., clusters, components, subject matter areas) within a curriculum are very similar regardless of the base from which they originate or the internal nature of the curriculum itself. (p. 37)

Simply stated, the trend toward clustering was gaining acceptance as a conceptual, or convenient, organizational structure.

Trott (1978) conducted a study of teacher education practices reported by a very select group of award-winning teachers. He found an extremely variable structure to teacher education programs while the data questioned some facets of teacher preparation because of their apparent mismatch with employment expectations.

Recently, a national study was conducted by the Virginia Polytechnic and State University Staff to develop a set of national standards for industrial arts. In the preliminary report, Dugger (1980) included information relating to industrial arts philosophy,

instruction, student populations and organizations, teachers, facilities, finances and evaluation. The major findings include:

(1) The perceptions of industrial arts appear to have changed little in the past seventeen years. The purpose cited as having the highest degree of emphasis is to develop in students a measure of skill in the use of common tools and machines.
(2) Industrial arts chairpersons, principals, and guidance coordinators in the three samples surveyed perceived industrial arts as being allied with general education and with the preparation of vocational-technical education.
(3) The industrial arts courses listed most frequently by industrial arts chairpersons as being offered in their schools were general woodworking, general metals, general industrial arts, architectural drafting and mechanical drawing. In all, sixty-one different courses were cited as being offered in the schools surveyed.

The lack of change from the results of previous surveys was the greatest disappointment of this nationwide study. From the data, the curriculum innovations of the 1960s apparently had little, if any, long-range effect on the evolution of curricular directions or course offerings.

Blankenbaker (1980), in a study concerning introductory technological literacy, concluded that:

> Given the increasing sophistication of our society, many believe it is imperative that all college graduates understand the basic concepts of technology and be able to make informed choices about technological alternatives. It seems reasonable that industrial educators should consider accepting the general education of all college graduates as a major goal. (p. 40)

General technology courses were offered in less than half of over 200 collegiate industrial education departments across the nation.

Certainly, such courses were not a major influence in the educational programs of very many college students.

Sredl and Everett (1981) conducted an extensive survey of state and province guides as the first step in a multiuniversity effort to develop a new planning guide for industrial education in Illinois. Collected documents were classified according to their focus on curriculum, planning or standards. The results of the study pointed out the inherent weaknesses in using such guides as the basis for further research. Most states neither publish nor promote the use of guides and of those in print, only sixteen have 1970s publication dates and relate directly to the design and implementation of curriculum models in industrial arts education.

Most recently, Isbell and Householder (1981) conducted a survey of one-hundred teacher educators to ascertain a priority rating of twenty-nine goals. With eighty-four returns, the following sample of goal statements project the future emphases of industrial arts teacher education. Rank order of the selected items are presented at the left of each statement.

Industrial arts teacher education will...

1 -- Provide laboratory experiences [which include] general skills relating to the use of tools and machines and the development of manipulative skill.

2 -- teach broad-based courses of construction, manufacturing, energy/power, communications, and transportation.

3.5 -- emphasize to graduates the need to provide an educational environment in which students learn about all aspects of industry and technology.

10.5 -- emphasize the importance of teaching a contemporary curriculum which will reflect existing and future influences upon a technological society.

> 23 -- become less theoretical in nature, emphasizing a more practical approach to teaching technology with some skill development training. (pp. 27-29)

Again, tool skills and manipulative activities led the list, with objectives relating to industrial and technological orientation placing second or lower in order of importance.

In conclusion, the industrial arts curriculum lacks a unified direction. It has a number of missions that will continue to be emphasized in the years ahead. McKnight (1977), a major publisher of textbooks in the field, suggested more patience with the speed of the change process. He encouraged leaders and followers to understand:

> In education, change comes slowly. Industrial arts is no exception. For some time to come we can expect to see woodworking, metalworking and drafting courses dominate student enrollment, while the cluster concept will be the dominant factor in emerging literature and curriculum design. Construction, manufacturing, communications, transportation and power/energy will experience growing demand, while the eternal "project" probably will remain center stage for most students and many instructors for years to come. The classroom activities that have only avocational values probably will become less popular, especially in times of budget restraint, than those with vocational value. (p. 138)

Many leaders in the field are not willing to wait another twenty years. As Luftig stated:

> Industrial arts must...help all students, male and female, acquire industrial and technological literacy so that they may successfully function in the society of the future. This literacy should include: an understanding of industry and its place in our culture; an understanding of industrial processes and the practical applications of scientific principles; and basic skills in the proper use of common industrial tools, machines and processes. (p. 142)

Aguirre (1977), in a strongly-worded statement, admonished those who continue to resist change.

> Although there is no precise agreed upon prescription for what an industrial arts program should uniformly be throughout the country... industrial arts departments which continue to isolate themselves in some corner of the school grounds, content to pride themselves in self-contained projects which are at best vestiges of some 1930 wood shop manual, will themselves become the dinosaurs of the educational planet--doomed to extinction for failing to adapt to a changing environment. (p. 4)

Lauda (1976) was optimistic in suggesting that industrial arts might fill an experiential vacuum in the education of all youth. Industrial arts education:

> ...is in the most opportune position of its tenure. No discipline is addressing itself to the concept of technology from a technical and socio-cultural standpoint in the public schools, yet millions of youngsters are being educated to survive in the inevitable technological society. (p. 105)

Leadership is needed at the state, regional, and national levels of education if industrial arts is to become more unified and comfortable with its philosophical identity, programmatic emphasis, and pedagogical legitimacy. A concerted effort by responsible personnel in teacher education and state agencies could foster such a direction-finding activity. Some cooperative ventures are already in existence and this research project has attempted as one of its objectives to study the nature and status of those endeavors.

CHAPTER III

RESEARCH DESIGN, METHODOLOGY AND PROCEDURES

The descriptive research method, employed in this study, involved two sequential steps. The first phase, document study, was accomplished by collecting and reviewing nearly 200 institutional catalogs and 50 state certification bulletins from across the nation. Since program revision is a continuous process, some of the gathered information may have been out of date. Therefore, the second phase, a national survey, provided validation of structural models, evidence of the change process, and quantification of collaborative efforts concerning program review and revision.

Description of the Subjects

Data for both aspects of this study were collected from the following two populations:

1. Industrial Arts Teacher Education department chairpersons of 200 colleges and universities listed in the 1982-83 Industrial Teacher Education Directory (Appendix A), and
2. Industrial Arts Education subject-area consultant-supervisors of the 50 state education departments (Appendix B).

These groups represented the total number of collegiate chairpersons and state officials in the United States, producing results that can be considered generalizeable to the entire populations and eliminating the necessity of sampling procedures.

Data Collection

Document study and survey questionnaires were the two data gathering techniques employed in this research project. This two-step process provided an efficient and effective method for collecting information from the two populations under study.

1. Document Study. Letters requesting documents were mailed on May 20th, 1983 to admissions officers of 200 colleges with undergraduate industrial arts teacher education programs (Appendix C) and 50 state consultant-supervisors of industrial arts education (Appendix D). Copies of institutional catalogs and certification bulletins were received and indexed during the summer months. In September, follow-up letters were sent to non-respondents urging participation in the nation-wide study (Appendix I).

The collection totaled 242 documents (96.8%), which provided a comprehensive and representative sample of national programs.

2. National Survey. This study was predicated on the assumption that industrial arts programs, whether in teacher education institutions or state education departments, emphasize one program design model. Survey respondents were asked to focus on the model which most closely approximated the model currently used within their institution or agency. The instruments (questionnaires) were designed to collect specific information regarding program model design, the change process, and frequency of interagency collaboration.

Instrumentation

Closely related questionnaires were designed for (1) Undergraduate Teacher Education Chairpersons-Coordinators, and (2) State Education Agency Consultants-Supervisors. These questionnaires were reviewed and field tested by two panels of consultants comprised of representatives from each of the target populations (Appendix E). Panel members were selected on the basis of (1) geographic distribution, or (2) national reputation. Based on the results of their critiques, trial use, and suggestions, the questionnaires were revised prior to national distribution.

The teacher-education survey (Appendix F) included questions regarding:

1. The program design model of the curriculum currently used in each institution's undergraduate industrial arts teacher education program;
2. A review of previous curricular refinements and a projection of anticipated changes; and
3. An estimate of their collaborative involvement in the specification of industrial arts teacher certification standards in each respective state.

The state department survey (Appendix G) included questions regarding:

1. The program design model currently used as the basis for the establishment or specification of industrial arts teacher certification standards within each respective state;

2. A review of recent changes and a projection of anticipated revisions in the standards; and
3. An estimate of their collaborative involvement in the design of curricula in the undergraduate industrial arts teacher education programs/institutions of their respective state.

Data Analysis

Based on the objectives stated in Chapter I, the analysis of the data was structured around the following research questions that were formulated for this study:

1. Which, and to what extent, have industrial arts structural models been implemented in teacher-education curricula and state department programs throughout the United States?
2. How closely do teacher-education curriculum models match certification standards for individual states?
3. What alterations in program design have recently occurred and/or are presently under study?
4. To what extent are teacher educators and state consultant-supervisors cooperatively involved in the study and updating of programs?

In order to answer those questions, data analysis occurred in four configurations. First of all, state consultants (50) and collegiate department chairpersons (200) were combined in order to establish the national status of industrial arts teacher education and certification.

Next, each of the two population sub-groups were compared with the total group in relation to many of the data categories. In addition, teacher education programs and certification standards were compared and analyzed for each of the fifty states. Finally, a regional analysis of the collected data provided insights into geographic trends in program design model utilization and revision (Appendix H).

The most recent revision of the Statistical Package for the Social Sciences (SPSS-X) was utilized in the collection, organization, and analysis of the data. Each of the 250 lines of information included twenty-five variables, based on the research questions previously posed in this chapter, and collected from documents and responses to the national survey.

Because of the design of the study, no sophisticated statistical analyses were necessary or desirable. Frequency distributions, percents and crosstabulations were utilized for the description of, and comparison between, state, regional, and national utilization of curriculum models and certification standards.

CHAPTER IV

PRESENTATION AND INTERPRETATION OF DATA

This chapter is designed to report the results of the study. It is divided into two major sections: (1) data obtained from a review of documents collected from collegiate and governmental education agencies; and (2) data obtained from questionnaire returns of industrial arts teacher education chairpersons and state consultant-supervisors of industrial arts. The information gathered during this study is presented in narrative and tabular forms as appropriate to the data.

Data Collected from Documents

The document search was closed in mid-October of 1983, when the collection totaled 192 catalogs and/or program sheets from colleges, representing 96% of that total population, with fifty certification bulletins received from state departments, constituting a 100% response.

A thorough inspection of the documents provided answers and insights into the first two research questions as presented in Chapter III:

Research Question 1:
Which, and to what extent, have industrial arts structural models been implemented in teacher-education curricula and state department programs throughout the United States?

Categorizing and counting program design models provided only a portion of the information needed to answer the first research

question, since it was found that many colleges and state agencies had merely clustered the traditional subject areas of industrial arts. In order to critically appraise the structural patterns, therefore, data were gathered regarding (1) program design models, (2) subject-area models, and if used, (3) quantities and titles of clusters used in the updated organizations.

Table 1 provides initial insight into the status of program design model utilization. The data were categorized as SUBJECT-BASED, the traditional orientation of separate subject areas, and CLUSTER-BASED, which includes trends toward a more contemporary approach to organizing industrial arts programs and standards. The data present an almost-even split (43.2% to 47.2%) between the two major patterns of programmatic organization. While college and university programs were evenly split between subject-based (96) and cluster-based (96) structures, state departments preferred cluster-based (22) organizations to

Table 1

Industrial Arts Program Design Models

Category	Frequency	Percent
Subject-Based Programs	108	43.2
Cluster-Based Programs	118	47.2
Approved Programs	16	6.4
Non-Respondents	8	3.2
	250	100.0

subject-based (12) by almost 2 to 1. All Approved Programs (16) were from teacher certification agencies and all Non-Respondents (8) were teacher education institutions.

Table 2 provides a more detailed analysis of programmatic evolution in industrial arts teacher education and certification. According to the data, over half of the colleges and agencies (56.8%) have retained the traditional approach to subject areas while a third (33.6%) have incorporated transitional course offerings and/or certification requirements into their programs. A complete break from

Table 2

Subject Area Offerings and Requirements

Category	Frequency	Percent
Traditional Subject Areas	142	56.8
Traditional-Transitional Combination	84	33.6
Transitional (Non-Traditional)	11	4.4
None-Non Reporting	13	5.2
	250	100.0

traditional orientation into cluster-oriented coursework (production, energy, communication, etc.) was reported in 11 of the 236 colleges and state agencies (4.4%) participating in the study, offering little evidence of trend-setting activity in the field.

Approximately half of the colleges (116 = 58.0%) and state departments (26 = 52.0%) reported retention of traditional subject area offerings/requirements. Similarly, about a third of the colleges (65 = 33.0%) and state departments (18 = 36.0%) reported utilization of some combination of traditional and transitional coursework. The most innovative programs (11) were found in ten colleges (5.0%) and one state department (2.0%).

Table 3 illustrates the five possible combinations of the data listed in Tables 1 and 2. They are listed and described as follows:

A. TRAD/TRAD. A traditional subject-centered program of industrial arts with coursework in traditional areas of woods, metals, drafting, etc.

B. TRAD/COMB. Also a traditional program model, but with a combination of traditional and transitional, cluster-oriented coursework.

C. TRAN/TRAD. A transitional cluster-organized program design of traditional subjects as in A above.

D. TRAN/COMB. Another cluster-organized design, including a combination of traditional and transitional, cluster-oriented courses.

E. TRAN/TRAN. A third cluster model with coursework relating to the transitional clusters of communications, energy and transportation, and industrial production.

Where appropriate, the two population sub-groups of teacher certification and teacher education were separated to assure a more

accurate illustration of overall program design utilization. Almost half (46.9%) of industrial arts teacher education programs across the country are traditional in structural model and course content. The second largest group of approximately one-third of the existing programs (D = 31.3%) has cluster-organized the traditional subjects

Table 3

Program Designs by Population Sub-Groups

Program Model	Teacher Certification Frequency	Percent	Teacher Education Frequency	Percent
A. TRAD/TRAD	11	22.0	90	46.9
B. TRAD/COMB	1	2.0	6	3.1
C. TRAN/TRAD	8	16.0	26	13.5
D. TRAN/COMB	14	28.0	60	31.3
E. TRAN/TRAN	0	0.0	10	5.2
F. APPROVED PROGRAM	16	32.0	0	0.0
	50	100.0	192	100.0

while adding coursework in transitional areas of industrial technology. Those programs, containing traditional courses in a cluster-oriented structure (C = 13.5%) remain loyal to the traditional industrial arts (A), and when summed, nearly constitute a two-thirds majority (A + C = 60.4%) of current programs.

For teacher certification programs though, the status seems quite different. Table 3 illustrates lesser emphasis on traditional program designs. Slightly more than one-third of the states (A + C = 38%) subscribe to a traditional design in certification standards. The shift towards transitional programs is similar to teacher education with more than one-quarter of the states (D = 28%) incorporating transitional structures and courses into requirements for certification. An extreme move into technology-oriented clusters and courses is apparently impractical, since the TRAN/TRAN classification failed to show (E = 0%) in the documents. Certification through program approval is acceptable in a number of states and constituted approximately one-third (F = 32%) of those participating in the study.

Table 4 provides additional descriptive information regarding the clusters addressed in the previous tables. Of the 16 institutions and

Table 4

Cluster Quantities in Program Design Models

Quantity	Frequency	Percent
2	3	2.9
3	46	44.7
4	46	44.7
5	6	5.8
6	2	1.9
	103	100.0

state departments that noted use of a cluster-based structure in documents, 103 offered evidence of the number of clusters incorporated into their design model. Almost half of the cluster-based programs utilized three clusters while the other half incorporated four clusters into their structures. Greater and lesser numbers of clusters constituted only 10% of those reporting. Programs in teacher education and certification with three clusters used titles of Graphic or Visual Communications, Materials and Processes or Manufacturing and Construction, and Power and Energy. Those with four clusters separated Construction and Manufacturing into two clusters.

Research Question 2:
How closely do teacher-education curriculum models match certification standards for individual states?

In Table 5, the documents obtained from each state's education department (certification) and colleges and universities (education) are compared. Certification models are designated with an "X" in the column of the appropriate program model in all cases except for the sixteen "PROGRAM APPROVAL" states. Teacher education models are quantified in appropriate model-columns by the number of institutions in each state which subscribe to a particular programmatic alternative.

States which certify teachers through program approval accept all types of program design models from accredited teacher education curricula. In all of those states, then, correspondence between certification and education is automatic.

Table 5

Program Model Use in Individual States

STATE - - CATEGORY	TRAD/TRAD	TRAD/COMB	TRAN/TRAD	TRAN/COMB	TRAN/TRAN
1. ALABAMA					
certification	X				
education	4		1	1	
2. ALASKA					
certification	(Approval of accredited programs)				
education	(no response)				
3. ARIZONA					
certification			X		
education	1		1		
4. ARKANSAS					
certification				X	
education	2				
5. CALIFORNIA					
certification	X				
education	6	1	1	2	
6. COLORADO					
certification				X	
education	3			1	

STATE - - CATEGORY	TRAD/TRAD	TRAD/COMB	TRAN/TRAD	TRAN/COMB	TRAN/TRAN
7. CONNECTICUT					
certification	X				
education			1		
8. DELAWARE					
certification				X	
education	1				
9. FLORIDA					
certification	X				
education	1			1	1
10. GEORGIA					
certification				X	
education	4				
11. HAWAII					
certification	(Approval of accredited programs)				
education	2				
12. IDAHO					
certification	X				
education	1				

STATE - - CATEGORY	TRAD/TRAD	TRAD/COMB	TRAN/TRAD	TRAN/COMB	TRAN/TRAN
13. ILLINOIS					
certification	X				
education	5			1	1
14. INDIANA					
certification	X				
education				3	
15. IOWA					
certification				X	
education	1			1	2
16. KANSAS					
certification			X		
education	2	1		2	1
17. KENTUCKY					
certification			X		
education	1	2		3	
18. LOUISIANA					
certification	X				
education	5				

STATE - - CATEGORY	TRAD/TRAD	TRAD/COMB	TRAN/TRAD	TRAN/COMB	TRAN/TRAN
19. MAINE					
certification				X	
education				1	
20. MARYLAND					
certification				X	
education	1			2	
21. MASSACHUSETTS					
certification		X			
education				1	
22. MICHIGAN					
certification	(Approval of accredited programs)				
education	3			2	
23. MINNESOTA					
certification	(Approval of accredited programs)				
education			1	5	1
24. MISSISSIPPI					
certification			X		
education	4		1		

STATE - CATEGORY	TRAD/TRAD	TRAD/COMB	TRAN/TRAD	TRAN/COMB	TRAN/TRAN
25. MISSOURI					
certification			X		
education	5		1	2	
26. MONTANA					
certification			X		
education	2		1		
27. NEBRASKA					
certification				X	
education	1	1	1	2	
28. NEVADA					
certification	(Approval of accredited programs)				
education	(Not evident from response)				
29. NEW HAMPSHIRE					
certification	(Approval of accredited programs)				
education	1				
30. NEW JERSEY					
certification	(Approval of accredited programs)				
education			2	2	

STATE - - CATEGORY	TRAD/TRAD	TRAD/COMB	TRAN/TRAD	TRAN/COMB	TRAN/TRAN
31. NEW MEXICO					
certification				X	
education			1	2	
32. NEW YORK					
certification	(Approval of accredited programs)				
education	2			2	
33. NORTH CAROLINA					
certification	(Approval of accredited programs)				
education	4		1	1	
34. NORTH DAKOTA					
certification	(Approval of accredited programs)				
education				1	
35. OHIO					
certification	X				
education	2		1	3	1
36. OKLAHOMA					
certification				X	
education	4		2	2	

STATE - - CATEGORY	TRAD/TRAD	TRAD/COMB	TRAN/TRAD	TRAN/COMB	TRAN/TRAN
37. OREGON					
certification	(Approval of accredited programs)				
education			1		
38. PENNSYLVANIA					
certification				X	
education			2	2	1
39. RHODE ISLAND					
certification	(Approval of accredited programs)				
education			1		
40. SOUTH CAROLINA					
certification			X		
education	1		1		
41. SOUTH DAKOTA					
certification	(Approval of accredited programs)				
education	2		1		
42. TENNESSEE					
certification				X	
education	4		1	3	

STATE - - CATEGORY	TRAD/TRAD	TRAD/COMB	TRAN/TRAD	TRAN/COMB	TRAN/TRAN
43. TEXAS					
certification			X		
education	8		1	4	
44. UTAH					
certification	(Approval of accredited programs)				
education	2		1		
45. VERMONT					
certification	X				
education	1				
46. VIRGINIA					
certification				X	
education	1		1	2	1
47. WASHINGTON					
certification	(Approval of accredited programs)				
education	3		1	1	
48. WEST VIRGINIA					
certification				X	
education				1	1

STATE - CATEGORY	TRAD/TRAD	TRAD/COMB	TRAN/TRAD	TRAN/COMB	TRAN/TRAN
49. WISCONSIN					
certification	(Approval of accredited programs)				
education			3		
50. WYOMING					
certification	X				
education			1		

One-to-one correspondence of program models existed in Idaho (1 of 1), Louisiana (5 of 5), Maine (1 of 1) and Vermont (1 of 1), showing a unified direction between the certifying agency and teacher-preparation institutions of those states.

In a number of states where certification standards prescribe specific program models as acceptable, colleges were often out of step with legislation as well as with each other. A total mismatch of program designs was reported in Arkansas (0 in 2), Delaware (0 in 1), Georgia (0 in 4), Indiana (0 in 3), and Wyoming (0 in 1). Alabama (4 of 6), Illinois (5 of 7), California (6 of 9), Maryland (2 of 3), Ohio (2 of 7), Oklahoma (2 of 8), and Tennessee (3 of 8), reported varying amounts of agreement between models of teacher preparation and those specified in teacher certification bulletins. Cooperative interaction is difficult to measure in such cases, but substantial transitional activity is evident. Interpretation of the lengthy listing provides

an indication of each state's contemporary status. All data are the result of the researcher's interpretation of document information as forwarded by state agencies and higher-education institutions.

Regionally, existing programs are presented in Table 6. For ease in interpreting the data, frequencies can be read in lines or columns. Percents, however, are by region only, and must be read by lines (left to right) to be meaningful. The institutional-agency totals are presented within parentheses for reference.

The Northeast section of the country incorporated cluster-based program models, with 60% reporting use of the design. Similar percentages existed in the Mideast and North Central regions of the country. Technologically-based, cluster-oriented programs similar to those that evolved during the sixties, were utilized in the industrial northeastern quadrant of the United States. From those three regions, 54% of all cluster-type programs existed in 44% of teacher education colleges and certification agencies.

While the Northwest registered a balanced use of the two basic program design models, percentages of use reversed in the remaining sections of the nation, with higher utilization recorded for more traditional, subject-based models.

Approved program certification was most prevalent (by percentage of regional tallies) in the Northeast and Northwest sections of the country. These regions had fewer institutions preparing industrial arts teachers, and the states had apparently found it necessary to

Table 6

Regional Distribution/Utilization of Program Models

Geographic Region	No Answer Freq/Pcent	Subject-Based Freq/Pcent	Cluster-Based Freq/Pcent	App. Prog. Freq/Pcent
Northeast (30)		8 26.7	18 60.0	4 13.3
Mideast (36)	1 2.8	12 33.3	22 61.1	1 2.8
Southeast (34)		20 58.8	14 41.2	
N. Central (44)		17 38.6	24 54.6	3 6.8
S. Central (43)	4 9.3	23 53.5	16 37.2	
Northwest (30)	1 3.3	12 40.0	12 40.0	5 16.7
Southwest (33)	2 6.1	16 48.5	12 36.4	3 9.1
Total (250)	8	108	118	16

accept diversity in teacher-education models, allowing for immigration of professionals. Conversely, with population shifts to the sunbelt states, the Southeast, South Central, and Southwest regions found little need of such flexibility.

Data Collected from Questionnaires

The general questionnaire, printed in two versions for teacher education and certification populations, was mailed in late November of 1983. In early January, 1984, a follow-up letter was sent to ninety-two non-respondents. Finally, a second follow-up letter with another

copy of the questionnaire was sent to sixty-four non-respondents in February, 1984. The nation-wide survey was closed in early March, 1984, with a final returned questionnaire count of 221, an 88.4% response. This aggregate response was composed of 47 state department consultants (94%) and 174 chairpersons of teacher-education programs (87%). Following is a compilation and analysis of the data collected from the questionnaires.

The first section of the instrument was designed to validate the program design model currently in use as determined by the researcher in the study of collected documents. Because of recent program changes, twenty documents were out of date necessitating adjustment in the mismatched data. The second and third sections of the questionnaire were designed to answer the final two research questions as previously posed in Chapter III.

Research Question 3:
What alterations in program design have recently occurred and/or are presently under study?

In order to gain an introductory perspective concerning program evolution, the questionnaire requested the age of the current program being used by the certifying agency or teacher education institution. Table 7 provides insight into the programmatic change process with 202 respondents (80.8%). While more than one-quarter of the respondents reported major revisions most recently, approximately 60% have changed within the past decade. Close to 90% have altered program design models within the twenty-year period since the sixties, the decade of revision and renewal in industrial arts.

Table 7

Age of Current Program

Years	Frequency	Percent
up to 5	56	27.7
6 - 10	64	31.7
11 - 15	25	12.4
16 - 20	31	15.4
21 - 30	15	7.4
31 and more	11	5.4
	202	100.0

A closer analysis of the data is of interest when total figures are separated into teacher certification and education sub-groups. This is accomplished in Table 8 wherein responses from 44 state consultants (88%) and 158 chairpersons of teacher education programs (79%) were tabulated. Relatively equal percentages of the two sub-populations have altered programs during the past five years. The similarity diminishes, though, upon inspecting the second five-year period wherein teacher-education programs underwent more substantial renovation than certification standards. Except for the second decade when nearly one-fifth of the states altered certification legislation, most percentages are comparable.

Table 8

Age of Current Program by Population Sub-Groups

Years	Teacher Certification Frequency	/Percent	Teacher Education Frequency	/Percent
Up to 5	13	29.5	43	27.2
6 - 10	10	22.7	54	34.2
11 - 15	6	13.6	19	12.1
16 - 20	6	13.6	25	15.8
21 - 30	8	18.3	7	4.4
31 and More	1	2.3	10	6.3
	44	100.0	158	100.0

Portions of programs often undergo refinement without affecting the total structure of the design model. Table 9 refers to such partial alterations as course revisions and additions that continually update subject-area offerings in teacher education and certification.

Table 9

Recent Major Program Changes

Category	Frequency	Percent
No Answer/No Change	112	50.7
Recent Change Reported	109	49.3
	221	100.0

Of the 221 (88.4%) respondents to a question, an almost even split is evident between those reporting recent major changes (within the past five years) and those admitting the lack of same.

A population sub-grouping of these figures is presented in Table 10, composed of responses from 47 state consultants (94%) and 174 teacher-education chairpersons (87%). According to their responses, state education departments have experienced relatively little change in industrial arts certification regulations during the past five

Table 10

Recent Major Program Changes by Population Sub-Groups

Category	Teacher Certification Frequency	/Percent	Teacher Education Frequency	/Percent
No Answer/No Change	35	74.5	77	44.3
Recent Change Reported	12	25.5	97	55.7
	47	100.0	174	100.0

years whereas more than half of the teacher-education chairpersons reported program alterations during the same period.

Regarding the second half of Research Question 2, which seeks information concerning program design alterations presently under study, the questionnaire asked respondents about projected changes. Table 11 presents the data as collected from 221 answers (88.4%). Refinements such as production-line experiences, alternative energy, computer operation, robotics, and general technological literacy were

most often mentioned as both past and projected changes. According to the data, approximately two thirds of the overall population are

Table 11

Projected Program Changes

Category	Frequency	Percent
No Answer/No Plans	77	34.8
Change Planned	144	65.2
	221	100.0

planning programmatic alterations. Obviously, a vast majority of leading professionals in industrial arts feel a need for such updating.

Breaking these totals into population sub-groups offers evidence of where the change is most likely to occur. Table 12 includes the

Table 12

Projected Program Changes by Population Sub-Groups

Category	Teacher Certification Frequency	Teacher Certification Percent	Teacher Education Frequency	Teacher Education Percent
No Answer/No Plans	27	57.4	50	28.7
Change Planned	20	42.6	124	71.3
	47	100.0	174	100.0

responses of the same 221 participants (88.4%). While less than 50% of state consultants project changes in the near future, nearly three-fourths of teacher educators have program refinements under study.

When asked to project a program model which seemed to be the direction of their deliberations, leaders in the field overwhelmingly established a cluster-oriented program design as the most preferred alternative to current models. Table 13 lists the answers of ninety-

Table 13

Projected Program Models

Program Model	Frequency	Percent
Traditional Subject-Based	3	3.3
Technological Cluster-Based	88	96.7
	91	100.0

one respondents (36.4%) who chose to participate in the prognostication. While the response of 91 is barely more than a third of the total population, it does constitute a substantial portion (63.2%) of the group who established themselves as projecting program changes in the near future as listed in Table 11.

Breaking this total into the two population sub-groups by seven regions shows where the responses originated. In Table 14, all

Table 14

Projected Program Models by Population Sub-Groups

Model Program	Teacher Certification Frequency	/Percent	Teacher Education Frequency	/Percent
Traditional Subject-Based	0	0.0	3	3.9
Technological Cluster-Based	14	100.0	74	96.1
	14	100.0	77	100.0

consultants projected cluster-oriented program renewals along with a vast majority of chairpersons. The technology-based, cluster-organized program models seem to be the most probable direction for program revisions. Only three teacher-educators foresaw a subject-based model as the direction for future program development at their institutions.

Regionally, the data regarding projected programs are less dramatic with the Northeast, Mideast, Southeast and Northwest regions. Each accounted for approximately 10% of the 88 cluster-based program designs. The North Central, South Central and Southwest sections of the country each accounted for approximately 20% of the projected adoption of cluster-based program models. These figures are listed in Table 15. The percentages for the three subject-based predictions are insignificant, but were listed to complete the tabulation. The South Central region, accounting for one-fifth of the total projected adoption of cluster-types of program formats, was one of the more

traditional regions as described in the current use data concerning program design models as previously presented in Table 6.

Table 15

Regional Distribution of Projected Program Models

Geographic Region	Subject-Based Frequency	Subject-Based Percent	Cluster-Based Frequency	Cluster-Based Percent
Northeast			11	12.5
Mideast	1	33.3	11	12.5
Southeast			7	8.0
N. Central	1	33.4	16	18.2
S. Central	1	33.3	18	20.4
Northwest			10	11.4
Southwest			15	17.0
	3	100.0	88	100.0

The prescribed cluster-oriented approach was further analyzed by subject areas. Table 16 lists data on such a projection. It is interesting to note that while professional leaders are tuned to the cluster-organized program, they continue to include traditional coursework as currently customary in most programs. Often this occurs in combination with transitional subject areas incorporating industrial technology bases.

Table 16

Projected Subject Models

Subject Model	Frequency	Percent
Traditional	18	19.8
Trad-Trans Combo	62	68.1
Transitional	11	12.1
	91	100.0

The same data, when separated into the population sub-groupings of Table 17, offer further explanation of probable directions for change. Relatively, the two groups project almost identical models for course-work and requirements from teacher education and certification. The slight variances in percentages could be considered negligible,

Table 17

Projected Subject Models by Population Sub-Groups

Subject Model	Teacher Certification Frequency/Percent		Teacher Education Frequency/Percent	
Traditional	3	21.4	15	19.5
Trad-Trans Combo	9	64.3	53	68.8
Transitional	2	14.3	9	11.7
	14	100.0	77	100.0

offering insight into a unified direction for change in the foreseeable future.

In the final portion of this section, the respondents were asked to cite their concept of an ideal industrial arts program model. Apparently many accepted the invitation to profess a philosophical viewpoint of personal conviction. In Table 18, respondents numbering 169 (94.9%) established the cluster-based program design as the most

Table 18

Ideal Program Models

Program Model	Frequency	Percent
Traditional Subject-Based	9	5.1
Technological Cluster-Based	169	94.9
	178	100.0

favored alternative for the future. The figure is a very close match for the projected program model figure (96.7%) of Table 13.

Table 19 reduced those figures into the two population sub-groups for clarification. As with the data in Table 14, differences in desired directions are negligible between state consultants and teacher education chairpersons.

Table 19

Ideal Program Models by Population Sub-Groups

Program Model	Teacher Certification Frequency	Percent	Teacher Education Frequency	Percent
Traditional Subject-Based	1	2.8	8	5.6
Technological Cluster-Based	35	97.2	134	94.4
	36	100.0	142	100.0

Respondents were also asked to profess a design model for subject areas. Table 20 provides the data gleaned from the answers received. As seen in the tabulation, a combination of traditional and transitional subject offerings is preferred as almost two-thirds of the respondents feel that way. Apparently there is some reticence toward complete change in a program that has worked well for so many years.

Table 20

Ideal Subject Models

Subject Model	Frequency	Percent
Traditional	21	11.8
Trad-Trans Combo	116	65.2
Transitional	41	23.0
	178	100.0

For a closer look at how the population sub-groups answered this question, Table 21 lists the categorized data. Upon inspection, the

Table 21

Ideal Subject Models by Population Sub-Groups

Subject Model	Teacher Certification Frequency	Teacher Certification Percent	Teacher Education Frequency	Teacher Education Percent
Traditional	4	11.1	17	12.0
Trad-Trans Combo	25	69.4	91	64.1
Transitional	7	19.5	34	23.9
	36	100.0	142	100.0

two groups again match closely by percentages in their desired directions for program renewal. The data closely match the information concerning projected subject models currently under study as presented in Table 17.

Obviously, many leaders in industrial arts believe and profess a personal choice of design model for programmatic organization and subject-area categorization and are committed to proposing and promoting similar directions in their respective state's and institution's plans currently under study.

Research Question 4:
To what extent are teacher educators and state consultant-supervisors cooperatively involved in the study and updating of programs?

The final three items in the questionnaire dealt with inter-agency articulation and cooperation. In order to objectively assess the amount of interactive involvement between the two sub-groups, quantities of encounters were requested. While quantification of meetings-of-the-minds falls short as an indication of action or results, frequency of contact provides at least one measure of purposeful professional activity.

An indication of articulation and consultation was requested in a number of ways. First, respondents were asked to provide information about inter-agency cooperation; that which had occurred between the teacher certification and teacher education population sub-groups. Two types of involvement were quantified as respondents reported on employing outside consultants in their activities or were involved as outreach consultants in the activities of other institutions and agencies. Next, intra-agency cooperation was questioned of members of each population sub-group wherein they reported the amount of inter-action with other members of the same sub-group as employers of, or consultants to services and/or programs.

The quantification of inter-agency dialogue is provided in Table 22. Each of the respondents was asked if professionals from the other population sub-group had participated in program review and/or revision at their particular institution or state department. Three-fifths (58.8%) reported the use of such people, while two-fifths (41.2%) noted a lack of contact with consultants or teacher educators from the other population sub-group.

Table 22

Inter-Agency Articulation and Cooperation

Category	Frequency	Percent
No - No Answer	91	41.2
Consultants Involved	130	58.8
	221	100.0

Table 23 categorizes the data into the two population sub-groups. Basically the same percentages carry through into the group-by-group

Table 23

Inter-Agency Articulation Between Population Sub-Groups

Category	Teacher Certification Frequency	Teacher Certification Percent	Teacher Education Frequency	Teacher Education Percent
No - No Answer	19	40.4	72	41.4
Consultants Involved	28	59.6	102	58.6
	47	100.0	174	100.0

presentation, showing little divergence from figures describing activity in the total population.

In addition to establishing the occurrence of such cooperative professional activity between population sub-groups, quantities of

Table 24

Quantities of Inter-Agency Consultation

Category	Frequency	Percent
1 - 3 Consultations	109	83.8
4 - 6 Consultations	15	11.6
7 - 10 Consultations	6	4.6
	130	100.0

such encounters were solicited from the respondents. Of the 130 professionals who reported such activity in Table 24, only a relatively small number (4.6%) cited extensive amounts of inter-agency cooperation. The largest proportion of active professionals (83.8%) reported up to three consultations.

Next, an indication of intra-agency articulation was requested. The figures in Table 25 show that only about one-third of the total

Table 25

Intra-Agency Articulation and Cooperation

Category	Frequency	Percent
No - No Answer	141	63.8
Consultants Involved	80	36.2
	221	100.0

population had elicited consultative assistance from colleagues. State consultants and teacher educators deal more frequently with each other than with colleagues of the same population sub-group.

A sub-group analysis of this phenomenon is provided in Table 26. That state consultants deal less with consultants from other states than they do with teacher educators may be easily explained through geographic proximity and jurisdiction. Consultants of a particular

Table 26

Intra-Agency Articulation Within Population Sub-Groups

Category	Teacher Certification Frequency	/Percent	Teacher Education Frequency	/Percent
No - No Answer	44	93.6	97	55.7
Consultants Involved	3	6.4	77	44.3
	47	100.0	174	100.0

state should be more active professionally with teacher-education institutions within the boundaries of their home state. In addition, less than half of collegiate chairpersons report use of teacher educators from other higher education institutions in program review and revision consultations.

Table 27 quantifies the intra-agency data by including only those 80 who answered the inquiry in a positive manner. While total con-

Table 27

Quantities of Intra-Agency Consultation

Category	Frequency	Percent
1 - 3 Consultations	59	73.8
4 - 6 Consultations	18	22.5
7 - 10 Consultations	3	3.7
	80	100.0

sultative activity is less within a population sub-group than between groups, percentages are similar. A higher percentage of 1 - 3 consultations existed in the inter-agency mode (Refer to Table 24 for comparison), and double the percentage of consultations was reported at the 4 - 6 meeting level in the intra-agency mode.

Outreach activities are the opposite of the consultations previously recorded and discussed. Respondents, in this case, were asked to comment on the frequency of activity in which they had acted as a consultant. Collegiate chairpersons were asked to record their consultations with state departments and state consultants reported on consultative activities at teacher education institutions. Table 28, inter-agency outreach, presents the limited amount that collegiate chairpersons and state consultants (36.6%) have been asked by others to participate in matters relating to program review and revision.

Table 28

Inter-Agency Outreach

Category	Frequency	Percent
No - No Answer	140	63.4
Consultations	81	36.6
	221	100.0

Further breakdown of the figures appears in Table 29, wherein each of the population sub-groups reported on such activities. Again the 2 to 3 ratio showed similarities between the sub-groups and the entire population included in the study.

Table 29

Inter-Agency Outreach Between Population Sub-Groups

Category	Teacher Certification Frequency/Percent		Teacher Education Frequency/Percent	
No - No Answer	32	68.1	108	62.1
Consultations	15	31.9	66	37.9
	47	100.0	174	100.0

Intra-agency outreach occurred when consultants were asked by other states to participate in program review and revision activities

and collegiate chairpersons became involved in similar activities at other higher education institutions. Table 30 presents totals for all respondents. The tallies depicted a higher percentage of non-involvement in this mode of consultation than in previous tabulations. Only one-fourth of the responding industrial arts leaders reported being involved in the programmatic change process of agencies or institutions like their own.

Table 30

Intra-Agency Outreach

Category	Frequency	Percent
No - No Answer	162	73.3
Consultations	59	26.7
	221	100.0

For further analysis of the consultative activity, Table 31 separates the data into population sub-groups. Only two state consultants reported being involved in programmatic renewal activities with state departments other than their own. Teacher education chairpersons, on the other hand, maintained the 2 to 3 ratio as prevalent in the previous tabulations of this section.

Table 31

Intra-Agency Outreach Within Population Sub-Groups

Category	Teacher Certification Frequency	/Percent	Teacher Education Frequency	/Percent
No - No Answer	45	95.7	117	67.2
Consultations	2	4.3	57	32.8
	47	100.0	174	100.0

Finally, 91 respondents quantified their outreach activities, both inter and intra-agency, as reported in Table 32. Approximately three-fourths of those responding had served as consultants for other colleges and/or state departments of education in a very limited way.

Table 32

Quantity of Outreach Consultation

Category	Frequency	Percent
1 - 3 Consultations	68	74.7
4 - 6 Consultations	16	17.6
7 - 10 Consultations	7	7.7
	91	100.0

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter includes (1) a summary of the purpose, methodology and results of the study; (2) conclusions derived from the presentation and interpretation of the data; and (3) recommendations for further study.

Summary

Purpose of the Study

This study was designed to provide a national overview of program design model utilization in industrial arts teacher education and certification. Specifically, its purpose was to establish the contemporary nature of delivery system design (undergraduate teacher-education programs) and licensing agency expectations (state certification standards), to determine the extent of a programmatic metamorphosis, and compare the results on the basis of individual states. In addition, it attempted to assess the degree of collaborative action between teacher education and certification personnel in the process of program review and revision.

Methodology

The descriptive research method utilized in this national study involved two sequential steps. In the first phase, document study, approximately 200 college catalogs/program sheets and 50 state certification bulletins were collected and reviewed in order to establish the state-of-the-art in program model utilization. Questionnaires

were used in the second phase to ascertain the validity of the data collected from the document study, assess the status of the change process in programmatic refinement and renewal, and establish the level of cooperative consultation that exists within and between teacher education and certification personnel, the two population sub-groups under study.

Results

The results of the study are based on a 96.8% response in the document search and an 88.4% response from the national survey.

1. The national status of program model utilization in industrial arts teacher education curricula is evenly divided between subject-based and cluster-based designs.
2. The national status of program model utilization in industrial arts teacher certification standards focuses on cluster-based organization over subject-based designs by a 2 to 1 margin.
3. Approximately 50% of teacher education courses and state certification regulations are based on traditional subject areas of industrial arts (woods, metals, drafting, etc.).
4. One-third of courses and regulations are based on cluster-oriented industrial technology subject areas.
5. Of the 103 respondents utilizing some form of cluster-organized program, 92 (89.4%) reported incorporation of three or four clusters in their design model.
6. The most frequently reported cluster titles are Graphic or Visual Communications, Manufacturing and Construction or Materials and Processes, and Energy and Power.

7. Certification standards for individual states are flexible in the licensing of industrial arts teachers with diverse preparatory backgrounds.
8. The Northeast quadrant of the country reported the greatest use of technologically-based, cluster-oriented program designs.
9. Sunbelt states report the greatest retention of traditional, subject-oriented program designs.
10. Approximately 90% of all industrial arts teacher education and certification programs have been updated within the past twenty years.
11. Recent refinements and additions to teacher education coursework include manufacturing processes, robotics, computers, alternative energy and technological literacy.
12. Two-thirds of the respondents are currently planning programmatic alterations. This includes nearly three-fourths of teacher educators and fifty percent of state consultants.
13. An overwhelming majority (96.7%) of teacher education chairpersons and state consultants project and prefer a technology-based, cluster-organized industrial arts program as the model of the future. Most (87.9%) predict the retention of the traditional subject areas in combination with cluster-oriented structures and coursework.
14. Almost sixty percent of the respondents reported use of inter-agency consultants in program review and revision activities

while only a third admitted involvement of intra-agency consultants in similar activities at their workplace.

15. Outreach activities, a measure of consultative activity in other agencies and institutions by respondents, amounted to a third of the population. Almost two-thirds reported no consulting activity of any sort. State consultants were rarely used (2 of 47) in program review of other states.

Conclusions and Interpretations

Twenty years of reading articles, monographs, and textbooks; of listening to presentations at regional conferences and national conventions; of teaching about innovative programmatic alternatives in an institution with a traditional orientation; and of pondering the changing status and direction of industrial arts education provided the foundation for this comprehensive study of the national status of program design model utilization in industrial arts teacher education and certification. As a result of the data collected, the following conclusions and interpretations are stated:

1. Generally, industrial arts teacher education curricula remain bound by tradition in spite of the passage of thirty years since the introduction of technology-based alternatives.

While little apparent change had occurred in secondary industrial arts programs during the two decades between the Schmitt (1961) and Dugger (1980) studies, it was assumed that teacher education programs had undergone substantial change. A cursory review of the data of

this study showed the incorporation of cluster organizations into approximately half of all teacher preparation programs across the country, but closer examination of the data revealed a retention of traditional subject areas by more than ninety percent of the respondents. Leaders of the profession apparently choose to organize technology-based clustering strategies, yet continue to deliver traditional content and practice in coursework.

2. Similarly, industrial arts teacher certification maintains a traditional stature, preferring to accept proven programs, but allowing for innovative alternatives within the specification of state standards.

Certification regulations were found to be slightly more flexible and change oriented than teacher education curricula. Perhaps this was because state consultants work directly with public school teachers who have been prepared in a number of alternative types of collegiate programs. Flexibility, then, is necessary as states attempt to attract teachers from a number of colleges and other states. Innovative teacher educators may have provided the profession with a number of programmatic refinements during the 1960s, but adaptation and adoption activities seem to have occurred more frequently during the 1970s and 1980s in state certification standards.

3. Teacher education chairpersons and state consultants are continually involved in programmatic review and revision activities, but most refinements merely relate to course additions or updating of content, rather than substantive structural reorganization.

Even though the results of the research seem rather disappointing, the evidence of continuous revision is prevalent in teacher education and certification. Instead of fostering a comprehensive restructuring of the industrial arts program, teacher educators and state consultants have been content to alter programmatic pieces, just as Lux (1976) had charged. It is easier to profess new directions and structures than to fundamentally alter a program that has stood the test of time. The profession may be gradually accepting cluster organization of the industrial arts program, but the traditional subjects of woods, metals, drafting, and other craft areas will remain for many years. Updating will focus on new technical information.

4. Only a limited amount of articulation and consultation has occurred within and between members of the teacher education and certification population sub-groups. Relatively few leaders share and consult on a national basis.

In a small number of states, leaders in teacher education and certification have joined in cooperative ventures to develop new and unified approaches to industrial arts. When neighboring colleges profess and provide alternative and/or conflicting philosophies and programs, it is not surprising that practitioners and the public are confused about the content, methods and products of the field. As a first step toward programmatic unification, the college and state department personnel of each state must gather to seek agreement in purpose and program.

5. General agreement concerning a new, national, conceptual framework for industrial arts is hindered by a lack of support from national leaders.

Philosophical division still exists between professional factions as during the sixties, when leaders suggested personal programmatic alternatives as "the" direction for the future. Currently, a prevocational emphasis is fostered by some while others propose radical restructuring into contemporary technology-based clusters and courses. The existence of two national professional organizations of industrial arts teachers with different missions fuel the fires of disagreement and dilute the strength of the profession. Until some semblance of programmatic unification is developed within and between these national organizations, industrial arts practitioners will continue to move in a number of directions.

6. Considerable enthusiasm has been expressed for technology-based programmatic alternatives, however, the data of this study show only limited evidence of change.

Without question, teacher educators and consultants prefer a technology-based cluster-organization program design as the "ideal" model of the future. At the same time, the researcher is left to wonder about the limited amount of purposeful effort that is being expended on its development. A technology-based program may offer more academic respectability, but a craft-based traditional program remains the comfortable, familiar, and preferred reality of practice in industrial arts programming.

Recommendations for Further Study

This study was conducted to investigate the national status of industrial arts program design model utilization in teacher education and certification. Questions that seem to warrant additional consideration and further investigation include:

1. Status and change studies of elementary, intermediate, and secondary industrial arts programs should be conducted on the basis of a national sample, geographic region or individual states. The results could be compared with those of this study to identify and unify programmatic alternatives worthy of support and concerted action.
2. This study, or a refinement of it, should be conducted periodically (every five to ten years) to assess the changing status of program design model utilization and revision of industrial arts teacher education and certification.

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APPENDICES

APPENDIX A

TEACHER EDUCATION

INSTITUTIONS AND CHAIRPERSONS

ALABAMA		
Alabama A & M University	D S*	Theo Weir
Auburn University	D S	Richard Baker
Livingston University	D S	J. Mark Estepp
Tuskegee Institute	D S	Lillie Robinson
University of Alabama	D	Wendell E. Jordan
Univ. of Alabama-Birmingham	D	W. Harry Armstrong
ARIZONA		
Arizona State University	D S	Z. A. Prust
Northern Arizona University	D S	R. Kerwood
ARKANSAS		
University of Arkansas	D S	Freeman Eads
Univ. of Arkansas-Pine Bluff		Walter L. McLarty, Jr.
University of Central Arkansas	D S	Kenneth F. Jordan
CALIFORNIA		
Calif. Polytechnic State Univ.	D S	Laurence F. Talbott
Calif. State Univ.-Chico	D S	Bill Wesley Brown
Calif. State Univ.-Fresno	D S	Gary E. Grannis
Calif. State Univ.-Long Beach	D S	Leonard Torres
Calif. State Univ.-Los Angeles	D S	Kenneth Phillips
Calif. State Univ.-San Francisco	D S	Robert Craig
Humboldt State University	D S	Dennis Potter
Pacific Union College	D S	Walter D. Cox
San Diego State University	D S	Dennis A. Dirksen
San Jose State University	D S	Donald J. Betando
COLORADO		
Adams State College	D S	Clarence R. Svendsen
Metropolitan State College	D S	David W. Parker
University of Northern Colorado	D S	David L. Jelden
University of Southern Colorado	D S	J. B. Morgan
Western State College	D S	Bernard Dutton
CONNECTICUT		
Central Conn. State University	D S	Michael Williams
DELAWARE		
Delaware State College	D	Donald E. Vornholt
FLORIDA		
Florida A & M University	D S	Herbert C. Beacham
Florida International University	D S	Dean Hauenstein
University of West Florida	D S	Charles H. Wentz

* D = Participant in Document Study
S = Participant in National Survey

GEORGIA		
Berry College	D S	Lee R. Clendenning
Georgia Southern College	D	H. R. Cheshire
Savannah State College	D S	Lester B. Johnson
University of Georgia	D S	Stephen R. Matt
HAWAII		
Brigham Young University	D S	Max McKinnon
University of Hawaii-Manoa	D S	Dale E. Thompson
IDAHO		
University of Idaho	D S	William R. Biggam
ILLINOIS		
Chicago State University	D S	Edward Reinhart
Eastern Illinois University	D S	John Wright
Illinois State University	D S	Everett N. Israel
Northern Illinois University	D S	T. B. Leamon
Southern Illinois University	D S	Raymond E. Bittle
University of Illinois	D S	Henry J. Sredl
Western Illinois University	D S	Wendell L. Swanson
INDIANA		
Ball State University	D S	Edgar S. Wagner
Indiana State University	D S	Lowell D. Anderson
Purdue University	D S	Joseph J. Carrel
IOWA		
Iowa State University	D S	William D. Wolansky
University of Northern Iowa	D	John T. Fecik
Westmar College	D S	Robert L. Franklin
William Penn College	D	Jim L. Drost
KANSAS		
Bethel College	D S	Rodney Frey
Emporia State University	D S	Noel O. Mintz
Fort Hays State University	D S	Fred Ruda
McPherson College	D S	John R. Pannabecker
Pittsburg State University	D S	F. Victor Sullivan
Wichita State University	D S	Edgar L. Webb
KENTUCKY		
Berea College	D S	Donald Hudson
Eastern Kentucky University	D S	Clyde O. Craft
Kentucky State University	D	William W. Bearden
Morehead State University	D S	Robert E. Newton
Murray State University	D S	Eddie R. Adams
Northern Kentucky University	D S	Ronald E. Abrams
Western Kentucky University	D S	Howard J. Lowrey

LOUISIANA		
Grambling State University	D	Edward M. Harrison
Louisiana State University	D S	James G. McMurray
Northwestern State University	D S	Charles H. Wommack
Southeastern Louisiana Univ.	D S	Benjamin H. Alsip
Univ. of Southwestern Louisiana	D	Roland Jenkins
MAINE		
University of Southern Maine	D S	Arthur O. Berry
MARYLAND		
Coppin State College	D S	John P. Suggs
University of Maryland	D S	Donald Maley
Univ. of Maryland-Eastern Shore	D	Lehman R. Tomlin
MASSACHUSETTS		
Fitchburg State College	D S	George B. James
MICHIGAN		
Andrews University	D S	L. L. Reinholtz
Central Michigan University	D S	J. Barry DuVall
Eastern Michigan University	D S	J. James Rokusek
Northern Michigan University	D S	Alson I. Kaumeheiwa
Western Michigan University	D S	John L. Feirer
MINNESOTA		
Bemidji State University	D S	Harlan L. Scherer
Mankato State University	D	Gordon Gavin
Moorhead State University	D S	Leland White
St. Cloud State University	D S	William J. LaCroix
University of Minnesota	D S	Jerome Moss, Jr.
University of Minnesota-Duluth	D S	Bernard J. DeRubeis
Winona State University	D S	Leo Morgan
MISSISSIPPI		
Alcorn State University	D S	Kenneth L. Simmons
Jackson State University	D S	Sam Cobbins
Mississippi State University	D S	Bruce E. Stirewalt
Miss. Valley State University	D	Arvid Mukes
Univ. of Southern Mississippi	D	William B. Burns
MISSOURI		
Central Missouri State Univ.	D S	William E. Brame
Missouri Southern State College	D S	Dennis K. Sutton
Northeast Missouri State Univ.	D S	Roland F. Nagel
Northwest Missouri State Univ.	D S	Herman Collins
Southeast Missouri State Univ.	D S	Robert L. Cox
Southwest Missouri State Univ.	D S	Orin R. Robinson
The School of the Ozarks	D S	Eldon Divine
University of Missouri	D S	Richard C. Erickson

MONTANA		
Montana State University	D S	Max L. Amberson
Northern Montana College	D S	Robert Hockett
Western Montana College	D S	Clayborn J. Anders
NEBRASKA		
Chadron State College	D S	M. L. Gramberg
Kearney State College	D S	Ronald Tuttle
Peru State College	D S	Lester F. Russell
University of Nebraska	D S	Max E. Hansen
Wayne State College	D S	Don E. Cattle
NEVADA		
University of Nevada	D S	Ivan E. Lee
NEW HAMPSHIRE		
Keene State College	D S	Richard F. Doble
NEW JERSEY		
Glassboro State College	D S	Paul D. VonHoltz
Kean College of New Jersey	D S	John J. Sladicka
Montclair State College	D S	George A. Olsen
Trenton State College	D S	J. Russell Kruppa
NEW MEXICO		
Eastern New Mexico University	D S	William J. Rosin
New Mexico Highlands University	D S	Donald S. Guerin
University of New Mexico	D S	Gerald E. Cunico
NEW YORK		
New York Univ.-Washington Square	D S	Ronald Todd
State University College-Buffalo	D S	Frank E. Sharkey, Jr.
State University College-Oswego	D S	Vernon A. Tryon
The City University of New York	D	R. Ezrol
NORTH CAROLINA		
Appalachian State University	D S	Frank R. Steckel
East Carolina University	D S	Elmer E. Erber
Elizabeth City State University	D	Bishop M. Patterson
N. C. Agri-Tech State University	D S	George C. Gail
North Carolina State University	D S	Joseph R. Clary
Western Carolina University	D	J. Dale Pounds
NORTH DAKOTA		
Valley City State College	D	Donald F. Mugan

OHIO		
Bowling Green State University	D S	Jerry Streichler
Central State University	D S	Bryant Crawford, Jr.
Kent State University	D S	David Mohan
Ohio Northern University	D S	Richard D. Kain
Ohio University	D S	Menno Diliberto
The Ohio State University	D S	Keith Blankenbaker
Wilmington College	D S	Edward B. Minnick
OKLAHOMA		
Central State University	D S	Emmet Osgood
East Central Oklahoma State Univ.	D S	Craig L. Benedict
Langston University	D	Raymond Johnson
Northeastern Oklahoma University	D S	Vernon Isom
Northwestern Oklahoma State Univ.	D S	Jerry R. Brownrigg
Oklahoma State University	D S	Melvin D. Miller
Panhandle State University	D S	Harold S. Kachel
Southeastern Oklahoma State Univ.	D	Alvin M. White
Southwestern Oklahoma State Univ.	D S	Don Mitchell
OREGON		
Oregon State University	D S	Pete Martinez
PENNSYLVANIA		
California State University	D S	Nevin E. Andre
Cheyney State University	D S	Donald L. Mixon, Jr.
Millersville State University	D S	Philip D. Wynn
The Pennsylvania State University	D S	John M. Shemick
Temple University	D S	Raymond Lolla
RHODE ISLAND		
Rhode Island College	D S	William F. Kavanaugh
SOUTH CAROLINA		
Clemson University	D S	Alfred F. Newton
South Carolina State College	D S	A. E. Lockert, Jr.
SOUTH DAKOTA		
Black Hills State College	D S	Leonard D. Edwards
Dakota State College	D S	Leslie Peterson
Northern State College	D S	Terry L. Richardson
TENNESSEE		
Austin Peay State University	D S	James R. Vinson
East Tennessee State University	D S	Charles H. Story
Memphis State University	D S	W. T. Brooks
Middle Tennessee State University	D S	Richard H. Gould
Southern College	D S	Wayne Janzen
Tennessee State University	D S	William S. Merriman
Tennessee Technological Univ.	D S	Harry T. Smith
The University of Tennessee	D S	Gerald D. Cheek

TEXAS		
Abilene Christian University	D S	Jerry D. Drenan
East Texas State University	D S	L. Dayle Yeager
North Texas State University	D S	John V. Richards
Prairie View A & M University	D	Harold S. Bonner
Sam Houston State University	D S	Nedom C. Muns
Southwest Texas State University	D S	G. Eugene Martin
Southwestern Adventist College	D S	Charles M. Underhill
Sul Ross State University	D	William C. Leavitt
Tarleton State University	D S	James C. Leeth
Texas A & M University	D S	Daniel L. Householder
Texas A & I University	D S	J. W. Hedrick
Texas Southern University	D	Robert L. Prater
The University of Texas-Tyler	D S	W. Clayton Allen
University of Houston	D S	William R. Forkner
West Texas State University	D	Donald D. Envick
UTAH		
Brigham Young University	D S	Jerry D. Grover
Southern Utah State College	D S	Paul W. Petersen
Utah State University	D S	Maurice G. Thomas
VERMONT		
University of Vermont	D S	Gerald R. Fuller
VIRGINIA		
James Madison University	D S	C. B. Dix
Norfolk State University	D S	George S. Foster
Old Dominion University	D S	John M. Ritz
Virginia Poly. Inst. & State Univ.	D S	William E. Dugger
Virginia State University	D S	W. Vincent Payne
WASHINGTON		
Central Washington University	D S	G. W. Beed
Eastern Washington University	D S	W. Dean Martin
Walla Walla College	D S	Chester D. Blake
Washington State University	D S	Merrill M. Oaks
Western Washington University	D S	Clyde M. Hackler
WEST VIRGINIA		
Fairmont State College	D S	James A. Hales
West Virginia Inst. of Tech.	D	Billy W. Frye
WISCONSIN		
Univ. of Wisconsin-Platteville	D S	Alva Jared
Univ. of Wisconsin-River Falls	D S	Russell L. Gerber
Univ. of Wisconsin-Stout	D S	Leonard F. Sterry
WYOMING		
University of Wyoming	D S	Olive Church

APPENDIX B

STATE EDUCATION

DEPARTMENTS AND CONSULTANTS

ALABAMA	D S*	Charles F. Tate
ALASKA	D S	Ray Minge
ARIZONA	D S	Hoyt R. Kenmore
ARKANSAS	D S	Charles W. Easley
CALIFORNIA	D S	Chris Almeida
COLORADO	D S	Bill Newblom
CONNECTICUT	D S	David M. Mordavsky
DELAWARE	D	Franklin D. Arbaugh
FLORIDA	D S	Ralph W. Steeb
GEORGIA	D S	Samuel L. Powell
HAWAII	D	Eric Chang
IDAHO	D S	Doug Hammer
ILLINOIS	D S	Robert Metzger
INDIANA	D S	Robert N. Thomas
IOWA	D S	Harold Berryhill
KANSAS	D S	Edwin Henry
KENTUCKY	D S	Robert Puttoff
LOUISIANA	D S	Jerry O'Shee
MAINE	D S	Thomas F. Birmingham
MARYLAND	D S	Allan B. Myers
MASSACHUSETTS	D	John DiRienzo
MICHIGAN	D S	James L. Rudnick
MINNESOTA	D S	Thomas Ryerson
MISSISSIPPI	D S	A. D. Nabers

* D = Participant in Document Study
S = Participant in National Survey

MISSOURI	D S	B. Eugene Brightwell
MONTANA	D S	Argenbright
NEBRASKA	D S	Lloyd Mather
NEVADA	D S	John M. Wadsworth
NEW HAMPSHIRE	D S	Ed Taylor
NEW JERSEY	D S	William R. Smith
NEW MEXICO	D S	Albert Zamora
NEW YORK	D S	William Boudreau
NORTH CAROLINA	D S	Leonard Goforth
NORTH DAKOTA	D S	Jerry P. Balistreri
OHIO	D S	Joseph R. Logsdon
OKLAHOMA	D S	Roger Stacy
OREGON	D S	John Fessant
PENNSYLVANIA	D S	Thomas Winters
RHODE ISLAND	D S	John Wilkinson
SOUTH CAROLINA	D S	William J. Singletary
SOUTH DAKOTA	D S	Wyland J. Borth
TENNESSEE	D S	Dennis Hirsch
TEXAS	D S	Neil Ballard
UTAH	D S	Ralph A. Andersen
VERMONT	D S	Richard Higgins
VIRGINIA	D S	Thomas A. Hughes, Jr.
WASHINGTON	D S	Richard Spice
WEST VIRGINIA	D S	Robert P. Martin
WISCONSIN	D S	William J. Ratzburg
WYOMING	D S	Harley Strayer

APPENDIX C

LETTERS REQUESTING DOCUMENTS OF

COLLEGIATE ADMISSIONS OFFICERS AND CHAIRPERSONS

Keene
State
College

229 Main Street
Keene, NH 03431

(603) 352-1909

May 20, 1983

Admissions Officer:

As part of a research project that I am conducting with the University of Massachusetts at Amherst, the initial stage involves a review of industrial arts teacher education programs throughout the country. In order to assist in that study, I would appreciate it if you would please forward a copy of your current catalog of undergraduate curricula.

Thank you very much. A mailing label is enclosed for your convenience.

Sincerely,

Robert C. Andrews,
Associate Professor
Industrial Education and Technology

RCA/b

Enc.

Keene
State
College

229 Main Street
Keene, NH 03431

(603) 352-1909

September 16, 1983

<N>

Dear Chairperson <S>:

Last Spring, I initiated a national status study of teacher education curricula in industrial arts. The first phase of the research involved document collection and review for which catalogs were requested of admissions officers from two hundred colleges. Of these, 151 have been received, constituting a 75% return. Obviously, the eventual results of the national study will be far better if a higher percentage of curriculum samples are considered in the work.

Your college is one from which no catalog was received. I am therefore requesting that you take a moment to send either a copy of the current institutional catalog or a copy of your program sheet for undergraduates in industrial arts teacher education.

Thank you very much for your assistance in this regard. A mailing label is enclosed for your convenience.

Sincerely,

Robert C. Andrews, Assoc. Prof.
Industrial Education & Technology

Encl-1

APPENDIX D

LETTERS REQUESTING DOCUMENTS OF STATE CONSULTANTS

Keene
State
College

229 Main Street
Keene, NH 03431

(603) 352-1909

May 20, 1983

<N>

Attn: <A>

As part of a research project that I am conducting with the Univerity of Massachusetts at Amherst, the initial stage involves a review of certification standards for industrial arts teachers on a national basis. In order to assist in that study, I would appreciate it if you would please forward a copy of your state's particular standards for the licensing of such professional personnel.

Thank you very much. A mailing label is enclosed for your convenience.

Sincerely,

Robert C. Andrews, Assoc. Prof.
Industrial Education & Technology

RCA/wpc

Keene
State
College

229 Main Street
Keene, NH 03431

(603) 352-1909

September 13, 1983

<N>

Dear Consultant <S>:

Last May, I wrote to you requesting a copy of your state's certification standards regarding industrial arts teachers. To date, I have received 37 of the 50 possible returns (74%), but since this is a national status study, meaningful data is necessary from the entire population of state consultants.

Hopefully, now that summer vacations are over and the academic year is underway, you will be able to send along the requested information so that your state's participation in, and contributions to, the research can be reported.

Thank you very much. A mailing label is enclosed for your convenience.

Sincerely,

Robert C. Andrews
Assoc. Prof. Ind. Ed. & Tech.

RCA/wpc

Encl. - 1

Keene
State
College

229 Main Street
Keene, NH 03431

(603) 352-1909

September 29, 1983

<N>

Dear Consultant <S>:

Thank you for promptly fulfilling my request for industrial arts teacher certification standards in your state. In a review of the materials that you sent me, however, I was only able to find information concerning Vocational/ Trade & Industry requirements. I am retaining those materials, but hoping that you will find the time to send along any pamphlets that relate, in particular, to Industrial Arts certification.

I certainly do appreciate your assistance in this matter as I do wish to include your state's standards in my national sample. A return address mailing label is enclosed for your convenience.

Sincerely,

Robert C. Andrews, Assoc. Prof.
Industrial Education & Technology

RCA:cc
Enclosure

APPENDIX E

PANELS OF CONSULTANTS WITH

RELATED CORRESPONDENCE

STATE CONSULTANTS:

Hoyt Kenmore	ARIZONA
David Mordavsky	CONNECTICUT
Ralph Steeb	FLORIDA
Thomas Birmingham	MAINE
Allan Myers	MARYLAND
Eugene Brightwell	MISSOURI
Ed Taylor	NEW HAMPSHIRE
Jerry Balistreri	NORTH DAKOTA
John Fessant	OREGON
Neil Ballard	TEXAS

TEACHER EDUCATORS:

Bill Wesley Brown	CALIFORNIA
Lee Clendenning	FLORIDA
Donald Lauda	ILLINOIS
Everett Israel	ILLINOIS
Arthur Berry	MAINE
Donald Maley	MARYLAND
George James	MASSACHUSETTS
Barry DuVall	MICHIGAN
Vernon Tryon	NEW YORK
Daniel Householder	TEXAS
William Dugger	VIRGINIA

Keene
State
College

229 Main Street
Keene, NH 03431

(603) 352-1909

November 1, 1983

<N>

Dear <S>:

I am presently in the final stages of my doctoral program, totally engrossed in data collection for my dissertation. The research project is a national status study of curriculum model implementation in industrial arts teacher education and its interrelationship with state certification standards.

Now that the first stage, data collection from documents, is about complete, I am composing a questionnaire to be sent out to collegiate chairpersons and state consultants. Since I am developing an instrument which is peculiar to the research, I am in need of a panel of consultants to review and suggest changes to the form prior to national distribution. For this purpose, then, I am requesting your participation as a member of that consulting team. Obviously, I realize just how involved we all become during a busy academic year, but certainly hope you will be able to find the relatively small amount of time needed to critique the questionnaire's format and contents and return it promptly for the final stage of data collection and analysis. Please complete the form below expressing your answer to this inquiry and return it in the enclosed envelope.

I certainly appreciate your consideration in this regard. The results of the study should be of prime interest to industrial arts teacher educators and consultants in particular, and to the entire profession in general.

Sincerely,

Robert C. Andrews, Assoc. Prof.
Industrial Education & Technology

Bob: Regarding your dissertation research and your request for a consulting review of your survey questionnaires,

[ ] I am pleased to be involved; send the materials immediately.

[ ] I am unable to assist you with a critique of your materials.

<N>

<I>

Keene
State
College

229 Main Street
Keene, NH 03431

(603) 352-1909

November 10th, 1983

Dear

Thank you for your generous offer to assist with a critique of my survey materials as I prepare for the final stage of my dissertation research. Enclosed are samples of a cover letter and questionnaire that will be sent, after revisions, to two hundred department chairpersons of undergraduate programs in industrial arts teacher education and fifty state consultants for industrial arts.

While the initial phase of the project involved the collection and review of almost two hundred college catalogs and fifty certification bulletins, this second stage utilizes a questionnaire to verify the data, check on the program revision process, and establish the change agents in curriculum and certification models. As you review the materials, consult the information contained in paragraph #2 of the cover letter for specific directions and please feel free to edit and suggest changes and/or alternatives as you see fit. The final letter and questionnaire will be composite documents, reflecting refinements as proposed by you and other members of the consulting team.

Thanks, again, for your professional involvement in this endeavor. Obviously, your prompt review and return of the enclosed materials will be most appreciated. A stamped, self-addressed envelope is enclosed for the convenient return mailing of the sample documents.

Gratefully,

Robert C. Andrews, Assoc. Prof.
Industrial Education & Technology

Enclosures

APPENDIX F

COVER LETTER AND QUESTIONNAIRE

SENT TO

INDUSTRIAL ARTS DEPARTMENT CHAIRPERSONS

Keene
State
College

229 Main Street
Keene, NH 03431

(603) 352-1909

November 30th, 1983

Dear

I am currently completing my doctorate at the University of Massachusetts in Amherst under the guidance of Professors Kenneth Ertel, William Wolf, and Anthony Butterfield. My dissertation research involves a nation-wide study of curriculum models utilized in industrial arts teacher education and corresponding certification standards of the fifty states. The first stage of the study, now completed, concerned a thorough investigation of documents from approximately two hundred undergraduate institutions and fifty state agencies, from which data were collected and analyzed.

For the second and final phase of the research project, a survey questionnaire is enclosed to (1) verify my findings of the first phase as collected from the documents, (2) estimate the extent of programmatic revision currently underway or projected, in regard to curricula and/or standards, and (3) establish a measure of interagency/interinstitution articulation and cooperation affecting the change process in undergraduate program models and state certification standards.

Please become an integral part of this project through your participation in this survey. Obviously, it will assist me in the completion of my dissertation. Even more important, your contribution will provide timely information regarding the contemporary status of industrial arts in teacher education programs and certification standards across the United States. The results will be analyzed and prepared for presentation at the AIAA-Columbus convention (proposal in process) and submitted for publication in a national journal. In addition, all participants will be appropriately identified in the appendices of the final document.

I sincerely appreciate the time and attention you give this project. A stamped, self-addressed envelope is enclosed for the convenient return of the completed questionnaire. Thank you very much!

Gratefully,

Robert C. Andrews, Assoc. Prof.
Industrial Arts & Technology

Enclosures

* * * * * * * * * * * * * * *

- TEACHER EDUCATION QUESTIONNAIRE -

********** INDUSTRIAL ARTS PROGRAM MODELS **********

- A NATIONAL SURVEY -

* * * * * * * * * * * * * * *

INTRODUCTION: This study is predicated on the assumption that industrial arts program designs, whether in teacher education institutions or state education agencies, emphasize one of three or four major models. As a result of a recently completed, thorough review of your institution's catalog, this short questionnaire is sent to (1) validate the curriculum design model currently used in your undergraduate program, (2) determine the nature and extent of any recent or anticipated changes in your curriculum design, and (3) estimate the level of cooperative, interactive involvement between industrial arts teacher educators and state consultants.

DIRECTIONS: Please take a few moments to read and complete the three sections of this questionnaire (ONLY 9 QUESTIONS IN 15 MINUTES OR LESS). Since the results of the study require the identification of each respondent in order to match up the data, please DO NOT remove the number printed below as it will render the form unusable. Individuals and responses WILL NOT be identified in the published results.

Your involvement in this national review of program models is appreciated. If possible, return the completed questionnaire within one week.

THANK YOU VERY MUCH

Robert C. Andrews, Assoc. Prof.
Department of Industrial Education & Technology
KEENE STATE COLLEGE OF THE UNIVERSITY SYSTEM OF NEW HAMPSHIRE
Keene, New Hampshire 03431
(603) 352-1909 x-370

This research project is conducted in partial fulfillment of the requirements of the Doctor of Education degree at the University of Massachusetts at Amherst

December 1983

E

PLEASE DO NOT REMOVE THIS NUMBER!

SECTION I: STATE OF THE ART

This portion of the questionnaire is designed to validate my interpretation of the data previously collected from your institution's undergraduate catalog. Please review the models presented below and either (a) check the design which most closely approximates your current program, or (b) provide an illustration on an attached sheet.

1. The industrial arts teacher education curriculum currently utilized in your college/university is based on (CHECK ONE ONLY):

   A. TRADITIONAL SEPARATE-SUBJECTS ORGANIZATION.....( )
   Usually includes up to eight traditional separate subjects of industrial arts (drafting, woodworking, metalworking, electricity, electronics, plastics, mechanics, graphic arts, etc.)

   B. CLUSTER ORGANIZATION OF TRADITIONAL SUBJECTS.....( )
   Organized into two to six clusters, each including related traditional separate subjects of industrial arts without new cluster-oriented coursework (visual communications: drafting and graphic arts; construction & manufacturing: woods, metals, plastics, etc.; power/energy/transportation: electricity, electronics, mechanics, etc.)

   C. CLUSTER ORGANIZATION WITH TRADITIONAL & CLUSTER COURSES...( )
   Basically the same as "B" above, but with the addition of cluster-oriented courses concerning construction, manufacturing processes, graphic communications, industrial production, alternative energy, etc.

   D. TECHNOLOGY EDUCATION CLUSTER ORGANIZATION.....( )
   Usually includes only three areas of industrial technology (communications, materials & processes, energy/power/transportation) with coursework related to those major titles rather than to traditional areas of industrial arts as presented in "A" above.

   E. OTHER PROGRAM DESIGN ALTERNATIVE NOT DESCRIBED ABOVE.....( )
   If you wish, title, illustrate and name the parts of your curriculum model on a separate sheet and include it with your return.

2. The curriculum design described above has been in effect ( ) years.

3. List or illustrate creative, innovative, or unique aspects, titles or courses in your industrial arts teacher preparation program that would assist in a more complete description of your curriculum.

SECTION II: CHANGE PROCESS

This second section of the questionnaire is designed to ascertain the nature and extent of past and projected changes in your undergraduate curriculum. Please provide complete answers to the questions as requested.

4. Have major changes recently occurred (within the past five years) in the program requirements for industrial arts teacher preparation at your institution? ( ) YES ( ) NO

   If "YES", what changes have taken place?

5. Are changes in the undergraduate program for industrial arts teacher preparation presently under consideration? ( ) YES ( ) NO

   If "YES", what types of changes are anticipated?

6. Briefly describe and/or graphically illustrate what you personally and professionally believe to be the most appropriate program design model for contemporary industrial arts.

SECTION III: INTERAGENCY ARTICULATION

This final portion of the survey is designed to estimate the level of cooperative, interactive involvement between faculties and consultants. Please provide answers to the three major questions presented in this section, and add appropriate explanations for each item as requested.

7. Have state consultants/supervisors participated in programmatic review and/or revision of the undergraduate industrial arts teacher education curriculum in your institution? ( ) YES ( ) NO

   If "YES", list the agencies and states represented by the consulting state department personnel:

   -AGENCIES- -STATES-

8. Have teacher educators from other institutions participated in programmatic review and/or revision of the undergraduate industrial arts teacher education program at your institution? ( ) YES ( ) NO

   If "YES", list the institutions and states represented by the consulting teacher education personnel:

   -INSTITUTIONS- -STATES-

9. Have you ever participated in industrial arts program review and/or revision consultations

   at other undergraduate institutions?.....( ) YES ( ) NO

   at state education departments?.....( ) YES ( ) NO

   If "YES", list the institutions/agencies and states attended by you for the purpose of assisting in consultation regarding program review and/or revision.

   -INSTITUTIONS/AGENCIES- -STATES-

WHEN COMPLETED -- -- RETURN IMMEDIATELY!

APPENDIX G

COVER LETTER AND QUESTIONNAIRE

SENT TO

STATE CONSULTANTS OF INDUSTRIAL ARTS

Keene
State
College

229 Main Street
Keene, NH 03431

(603) 352-1909

November 30th, 1983

Dear

I am currently completing my doctorate at the University of Massachusetts in Amherst under the guidance of Professors Kenneth Ertel, William Wolf, and Anthony Butterfield. My dissertation research involves a nation-wide study of curriculum models utilized in industrial arts teacher education and corresponding certification standards of the fifty states. The first stage of the study, now completed, concerned a thorough investigation of documents from approximately two hundred undergraduate institutions and fifty state agencies, from which data were collected and analyzed.

For the second and final phase of the research project, a survey questionnaire is enclosed to (1) verify my findings of the first phase as collected from the documents, (2) estimate the extent of programmatic revision currently underway or projected, in regard to curricula and/or standards, and (3) establish a measure of interagency/interinstitution articulation and cooperation affecting the change process in undergraduate program models and state certification standards.

Please become an integral part of this project through your participation in this survey. Obviously, it will assist me in the completion of my dissertation. Even more important, your contribution will provide timely information regarding the contemporary status of industrial arts in teacher education programs and certification standards across the United States. The results will be analyzed and prepared for presentation at the AIAA-Columbus convention (proposal in process) and submitted for publication in a national journal. In addition, all participants will be appropriately identified in the appendices of the final document.

I sincerely appreciate the time and attention you give this project. A stamped, self-addressed envelope is enclosed for the convenient return of the completed questionnaire. Thank you very much!

Gratefully,

Robert C. Andrews, Assoc. Prof.
Industrial Arts & Technology

Enclosures

* * * * * * * * * * * * * * *

- TEACHER CERTIFICATION QUESTIONNAIRE -

********** INDUSTRIAL ARTS PROGRAM MODELS **********

- A NATIONAL SURVEY -

* * * * * * * * * * * * * * *

INTRODUCTION: This study is predicated on the assumption that industrial arts program designs, whether in teacher education institutions or state education agencies, emphasize one of three or four major models. As a result of a recently completed, thorough review of your agency's certification bulletin, this short questionnaire is sent to (1) validate the program design model currently used in your state agency, (2) determine the nature and extent of any recent or anticipated changes in your program design, and (3) estimate the level of cooperative, interactive involvement between industrial arts teacher educators and state consultants.

DIRECTIONS: Please take a few moments to read and complete the three sections of this questionnaire (ONLY 9 QUESTIONS IN 15 MINUTES OR LESS). Since the results of the study require the identification of each respondent in order to match up the data, please DO NOT remove the number printed below as it will render the form unusable. Individuals and responses WILL NOT be identified in the published results.

Your involvement in this national review of program models is appreciated. If possible, return the completed questionnaire within one week.

THANK YOU VERY MUCH

Robert C. Andrews, Assoc. Prof.
Department of Industrial Education & Technology
KEENE STATE COLLEGE OF THE UNIVERSITY SYSTEM OF NEW HAMPSHIRE
Keene, New Hampshire 03431
(603) 352-1909 x-370

This research project is conducted in partial fulfillment of the requirements of the Doctor of Education degree at the University of Massachusetts at Amherst

December 1983

C

PLEASE DO NOT REMOVE THIS NUMBER!

SECTION I: STATE OF THE ART

This portion of the questionnaire is designed to validate my interpretation of the data previously collected from your state's certification bulletin. Please review the models presented below and either (a) check the design which most closely approximates your current program, or (b) provide an illustration on an attached sheet.

1. The industrial arts teacher certification standards currently utilized in your state department are based on (CHECK ONE ONLY):

   A. TRADITIONAL SEPARATE-SUBJECTS ORGANIZATION.....( )
   Usually includes up to eight traditional separate subjects of industrial arts (drafting, woodworking, metalworking, electricity, electronics, plastics, mechanics, graphic arts, etc.)

   B. CLUSTER ORGANIZATION OF TRADITIONAL SUBJECTS.....( )
   Organized into two to six clusters, each including related traditional separate subjects of industrial arts without new cluster-oriented coursework (visual communications: drafting and graphic arts; construction & manufacturing: woods, metals, plastics, etc.; power/energy/transportation: electricity, electronics, mechanics, etc.)

   C. CLUSTER ORGANIZATION WITH TRADITIONAL & CLUSTER COURSES...( )
   Basically the same as "B" above, but with the addition of cluster-oriented courses concerning construction, manufacturing processes, graphic communications, industrial production, alternative energy, etc.

   D. TECHNOLOGY EDUCATION CLUSTER ORGANIZATION.....( )
   Usually includes only three areas of industrial technology (communications, materials & processes, energy/power/transportation) with coursework related to those major titles rather than to traditional areas of industrial arts as presented in "A" above.

   E. OTHER / CERTIFICATION BY APPROVED PROGRAM.....( )
   If you wish, illustrate and name the parts of your certification model on a separate sheet and include it with your return.

2. The state standards described above have been in effect ( ) years.

3. List or illustrate creative, innovative, or unique aspects, titles or courses in your industrial arts teacher certification standards that would assist in a more complete description of your program.

SECTION II: CHANGE PROCESS

This second section of the questionnaire is designed to ascertain the nature and extent of past and projected changes in your certification standards. Please provide complete answers to the questions as requested.

4. Have major changes recently occurred (within the past five years) in the requirements for industrial arts teacher certification in your state? ( ) YES ( ) NO

   If "YES", what changes have taken place?

5. Are changes in the state standards for industrial arts teacher certification presently under consideration? ( ) YES ( ) NO

   If "YES", what types of changes are anticipated?

6. Briefly describe and/or graphically illustrate what you personally and professionally believe to be the most appropriate program design model for contemporary industrial arts.

SECTION III: INTERAGENCY ARTICULATION

This final portion of the survey is designed to estimate the level of cooperative, interactive involvement between faculties and consultants. Please provide answers to the three major questions presented in this section, and add appropriate explanations for each item as requested.

7. Have teacher educators participated in programmatic review and/or revision of the industrial arts teacher certification standards in your state? ( ) YES ( ) NO

If "YES", list the institutions and states represented by the consulting teacher education personnel:

-INSTITUTIONS- -STATES-

8. Have consultants/supervisors from other states participated in programmatic review and/or revision of the industrial arts teacher certification standards in your state? ( ) YES ( ) NO

If "YES", list the agencies and states represented by the consulting state department personnel:

-AGENCIES- -STATES-

9. Have you ever participated in industrial arts program review and/or revision consultations

at other state education departments?.....( ) YES ( ) NO

at undergraduate institutions?.....( ) YES ( ) NO

If "YES", list the institutions/agencies and states attended by you for the purpose of assisting in consultation regarding program review and/or revision.

-INSTITUTIONS/AGENCIES- -STATES-

WHEN COMPLETED -- -- RETURN IMMEDIATELY!

APPENDIX H

GEOGRAPHIC REGIONS OF STATES

Region 1: NORTHEAST (10 state agencies and 20 colleges = 30)

Connecticut	New Jersey
Delaware	New York
Maine	Pennsylvania
Massachusetts	Rhode Island
New Hampshire	Vermont

Region 2: MIDEAST (6 state agencies and 30 colleges = 36)

Kentucky	Ohio
Maryland	Virginia
North Carolina	West Virginia

Region 3: SOUTHEAST (6 state agencies and 28 colleges = 34)

Alabama	Mississippi
Florida	South Carolina
Georgia	Tennessee

Region 4: NORTH CENTRAL (7 state agencies and 37 colleges = 44)

Illinois	Michigan
Indiana	Minnesota
Iowa	Missouri
	Wisconsin

Region 5: SOUTH CENTRAL (5 state agencies and 38 colleges = 43)

Arkansas	Louisiana
Kansas	Oklahoma
	Texas

Region 6: NORTHWEST (9 state agencies and 21 colleges = 30)

Alaska	North Dakota
Idaho	Oregon
Montana	South Dakota
Nebraska	Washington
	Wyoming

Region 7: SOUTHWEST (7 state agencies and 26 colleges = 33)

Arizona	Hawaii
California	Nevada
Colorado	New Mexico
	Utah

APPENDIX I

FOLLOW-UP LETTERS

Keene
State
College

229 Main Street
Keene, NH 03431

(603) 352-1909

January 15th, 1984

<N>

Dear <S>:

Early in December, I mailed a questionnaire to you regarding industrial arts program design models. As of this date, I have not received your completed questionnaire. Now that the busy holiday season is over, I am sending along this follow-up letter as a reminder, requesting your participation in this national study.

The questionnaire, printed on buff yellow paper, involves (1) the identification of the program design model utilized by your college/state department, (2) a specification of recent and projected programmatic alterations, and (3) an indication of interagency cooperation in program development. As a nationwide study involving 50 state consultants and 200 collegiate chairpersons, the research results should provide an accurate assessment of the state-of-the-art in industrial arts teacher education and certification programs.

Please take a few moments to complete and return the questionnaire during the next few days. I would like your college/state to be included in my data for a more complete overview of the contemporary status of industrial arts. I sincerely appreciate the time and attention you provide in this endeavor and look forward to receiving your completed form in the near future.

Thank you very much,

Robert C. Andrews, Assoc. Prof.
Industrial Education & Technology

Keene
State
College

229 Main Street
Keene, NH 03431

(603) 352-1909

February 10th, 1984

<N>

Dear <S>:

Between Thanksgiving and Christmas, I sent a questionnaire to you regarding the national status of industrial arts program design models utilized in teacher education and certification. In addition, I recently sent a follow-up letter urging your participation in the research project. Since I have not received the completed form as of this date, I'm sending along another copy of the questionnaire, hoping you'll find a few moments in your busy schedule to answer the nine questions.

My research results are almost complete and ready for analysis, but I would like to have as large a population sample as possible. I expect to compile and process the data before the end of the month so would certainly appreciate your involvement in this nation-wide effort within the next few days. Please complete the form following the directions and return it in the enclosed envelope.

Thank you very much,

Robert C. Andrews, Assoc. Prof.
Industrial Education & Technology

Enclosures

BIOGRAPHICAL SKETCH

Robert C. Andrews was born on Martha's Vineyard Island, off the coast of Massachusetts on Thanksgiving evening, November 25th, 1937.

His educational preparation began in the public schools of the Town of Tisbury, from which he graduated in 1955. Following four years of undergraduate study majoring in Industrial Arts Education, he was awarded a degree (B.S.Ed.-1959) from Fitchburg State College. Further education included Northeastern University (M.Ed.-1965), summer study at the universities of Maryland and Illinois, and completion of a Certificate of Advanced Graduate Study (1971) and Doctor of Education (1984) at the University of Massachusetts-Amherst.

Twenty-five years of professional experience include industrial arts teaching in the secondary schools of Martha's Vineyard and Chelmsford, Massachusetts; and professorial appointments at Lowell Technological Institute (MA) and Keene State College (NH).

He authored a revision of Ericson's text under the new title, TEACHING INDUSTRIAL EDUCATION: PRINCIPLES AND PRACTICES, published by the Bennett Company of Peoria, Illinois, in 1976.

He is married to Emily Steere Andrews and is the father of three sons, Michael, David and Peter.