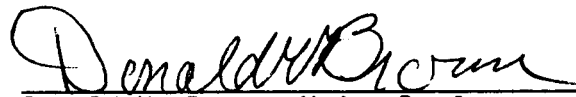
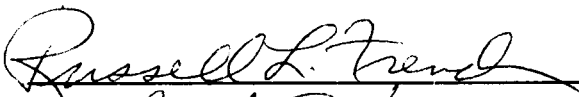


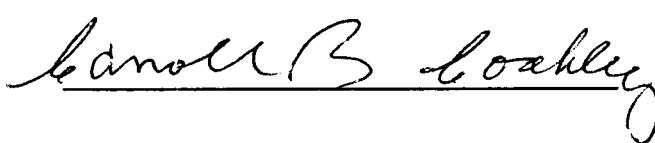
To the Graduate Council:

I am submitting herewith a dissertation written by Robert Gordon Harrison entitled "An Evaluation of the Undergraduate Industrial Arts Teacher Education Program at The University of Tennessee, Knoxville, by Its Graduates." I have examined the final copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Education, with a major in Vocational-Technical Education.


Donald V. Brown, Major Professor

We have read this dissertation
and recommend its acceptance:





Accepted for the Council:


The Graduate School

AN EVALUATION OF THE UNDERGRADUATE INDUSTRIAL ARTS TEACHER
EDUCATION PROGRAM AT THE UNIVERSITY OF TENNESSEE,
KNOXVILLE, BY ITS GRADUATES

A Dissertation
Presented for the
Doctor of Education
Degree
The University of Tennessee, Knoxville

Robert Gordon Harrison

December 1983

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ABSTRACT

The purpose of this study was to evaluate the perceptions of the 1971-1980 graduates who had majored in Industrial Education with the Industrial Arts Teacher Education option at The University of Tennessee, Knoxville, concerning the effectiveness of the program in meeting their needs after having become employed.

Data for the study were obtained from completed questionnaires received from 61 of the 86 graduates who had majored in the Industrial Arts Teacher Education program. The responses were coded and computed to include frequencies, percentages, measures of central tendency, cross tabulations, and comparisons between groups.

The following findings were based on the analysis and interpretation of the data. (1) The vast majority (91.4 percent) of the respondents were residing in the southeastern United States with 81.0 percent living in Tennessee. (2) Of the study population, 62.1 percent were employed in areas outside of education. (3) The majority (53.4 percent) of the respondents had changed occupations at least once since receiving their baccalaureate degree. (4) Of the respondents, 34.5 percent had received one or more advanced degrees and 27.6 percent were working toward an advanced degree. (5) The majority of the respondents indicated that, overall, the courses offered in Industrial Arts Teacher Education were of "reasonable" or "maximum" value. (6) The perceived overriding advantage of a career in industrial arts was that it provides

versatile experiences which enable individuals to pursue work not only in education but also in industry.

Four major conclusions were derived from the study. (1) The Industrial Arts program at The University of Tennessee, Knoxville is sensitive to area needs and tends to prepare graduates for regional employment, both within and outside of education. (2) Once a graduate leaves teaching to seek employment in another field, he/she will not likely return to the teaching profession. (3) The Industrial Arts graduates, in general, are motivated to maintain and enhance their competencies in education through advanced degrees. (4) The program is providing the necessary skills basic both to education and to other related occupations.

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CHAPTER I

INTRODUCTION TO THE STUDY

The quality of education in the United States has been declining since the late 1960s when schools shifted their focus from scientific achievement to social relevance ("Low Tech Education," 1983). Today, with the enormous growth in technology, the nation is having to reverse this trend, by increasing the importance of quality in education. This concern is evidenced by Secretary of Education, Terrel H. Bell, who said:

If we don't do more to strengthen our education program and have a more rigorous and demanding curriculum, we're going to start losing out to competitors abroad who are making that commitment (Businessweek, 1983).

It may be necessary to make a more rigorous and demanding curriculum. A reasonable starting point may be to evaluate educational programs. This evaluation may be done in various ways. One method of evaluating the adequacy of a program may be to inquire as to how well the graduates have been able to secure, perform, and progress in positions for which they were prepared. Institutions of higher education should be concerned with their graduates (Bostford, 1975). Making decisions about the effectiveness of education cannot be adequately accomplished without first observing the results of education (Brantner, 1975).

Continual evaluation and challenge are necessary to industrial arts teacher education just as with any curriculum area if it is to

adequately discharge its responsibility in the preparation of future teachers. It is the responsibility of teacher education institutions to provide the opportunity and monitor the effectiveness of its students to learn and apply the skills and knowledge necessary for them to be competent educators.

One common means of studying graduates is through the use of a follow-up study. The importance of follow-up studies is rapidly receiving recognition, especially in vocational education as demonstrated in the Vocational Amendments of 1968. The American Vocational Journal also selected follow-up as one of its themes in 1975 because of its importance in establishing quality education (Gilli, 1975).

Statement of the Problem

The Industrial Arts program at The University of Tennessee, Knoxville, has been in existence since 1960. During these years, some courses have been added, some dropped, and others altered. The problem that stimulated research in this area was a lack of definitive information about the undergraduate Industrial Arts Teacher Education program offered at The University of Tennessee, Knoxville.

In order to maintain any viable and meaningful educational program, planning and periodic evaluation of the program should be carried out utilizing information provided by the graduates. Such follow-up efforts seek objective information regarding the current status of former graduates as well as attitudinal and opinion data concerning the graduates' perceptions of the adequacy of their

training. Industrial arts programs are no exception. The complex structure of such programs requires varied measures of evaluation and input from selected sources. A formal study of the graduates is one method of determining the degree of success of a program.

Purpose of the Study

The purpose of this study was to evaluate the perceptions of the 1971-1980 graduates who had majored in the Industrial Arts Teacher Education option, concerning the effectiveness of the program in meeting the needs of the graduates as they become aware of the skills required of a teacher. Specifically, as a means of designing the research plan, the study sought to determine the graduates' geographic location, job status, the pursuit of additional education, perceived advantages of a career in industrial arts, and perceived value of the industrial arts courses, and to obtain suggestions for improving the Industrial Arts program at The University of Tennessee, Knoxville.

Research Questions

The research questions under which this study was conducted were:

1. Where do the graduates live and in what occupations are they employed?
2. How many graduates have changed occupations and why did they do so?
3. What has been the nature and amount of additional training pursued by the graduates and why?

4. What do the graduates perceive to be the advantages of a career in industrial arts?
5. What importance do the graduates place on the courses taught in the Industrial Arts Teacher Education program-- what was most useful and least useful?
6. What suggestions do the graduates have for the improvement of the Industrial Arts program at The University of Tennessee, Knoxville?

Assumptions

In the present study, it was assumed that the opinions of the graduates were a valid resource to be used as a means for evaluation of the Industrial Arts program. It was also assumed that a questionnaire could be designed to elicit objective and accurate information.

Limitations

The following limitations were applied to this study:

1. This study was limited to those persons who received a Bachelor's degree in Education with a major in Industrial Arts from August 1, 1971 through June 30, 1980.
2. Findings were limited to the results of a mailed questionnaire and the amount of cooperation offered by the graduates in filling out and returning the survey instrument.

3. The results of this study have specific relevance only to the Industrial Arts Teacher Education program at The University of Tennessee, Knoxville.

Definition of Terms

To help prevent misunderstanding in discussing the results of this research, the following definitions are provided:

1. AREA-UNIT LABORATORY--A section of a shop or laboratory designed and equipped specifically as an activity area emphasizing experimental research and development types of instructional activity.
2. BASIC SUBJECT AREAS--The basic subject areas of industrial arts: drafting, electricity/electronics, graphic arts, metals, plastics, power and transportation, woods, construction, and manufacturing.
3. GRADUATE--An individual who has received a Bachelor's degree in Education with a major in Industrial Arts from The University of Tennessee, Knoxville.
4. NON-TEACHING GRADUATES--Those graduates employed in any industry or other non-educational work.
5. PROFESSIONAL COURSES--Those courses that deal with the study of the history, philosophy, educational psychology, organization of content, arrangement of the teaching laboratory, and methods of teaching industrial arts.

6. TEACHING GRADUATES--Those graduates employed in any type of public, private, or industrial education field directly related to teaching about or training for industry.
7. TECHNICAL COURSES--Those industrial arts courses offered in the basic subject areas of industrial arts at The University of Tennessee, Knoxville.
8. UNIT SHOP--A space designed and equipped to provide study and experience in a single industrial activity and/or material.

Organization of the Study

This study is presented in five chapters with accompanying references and appendixes.

Chapter I contains an introduction to the study to include the statement of the problem, the purpose of the study, the research questions to be answered in the study, the assumptions made in the study, the limitations of the study, a list of terms and their definitions, and the organization of the study.

Chapter II contains a discussion of the significance of graduate follow-up studies, a summarization of the review of related literature, and a summary of implications of this review for the present study.

Chapter III contains the methodology used in the study to include the population, the development of the survey instrument, the data collection procedures and response rates, the methods of analyzing the data, and the summary.

Chapter IV contains the discussion and analysis of the data collected in this study.

Chapter V contains the summary of procedures of the study, the major findings which resulted from the analyzed data, conclusions based on the findings, and recommendations.

CHAPTER II

REVIEW OF RELATED LITERATURE

Evaluation is one of mankind's most pervasive activities. Although not often recognized as such, it goes on all the time.

Man's whole view of self-in-world, his whole pattern of learned behaviors, is founded on an ongoing evaluation of what he does or may do (Moursund, 1973, p. 1).

As with other natural, logical processes, evaluation can be refined and expanded by conscious effort--by considering the consequences of alternative behaviors and developing ways of doing things that will result in desired outcomes. This process, in turn, can be applied deliberately to a wide variety of situations.

Formal evaluation techniques began as sporadic, small-scale attempts at the quantification of data. In recent years, applied research has emerged as a broad-scale movement in social science resulting in the development of a body of knowledge having a direct impact on future policy making. Applied research, then, is designed with a specific purpose--that of decision making: In this instance, it sought to answer whether or not the program in question was doing what it purported to do.

The study was designed with the intent to measure the perceived adequacy of The University of Tennessee, Knoxville, Industrial Arts program in meeting the needs of its graduates. The stated purpose of this study (Chapter 1) was to evaluate the perceptions of those students who graduated between the years 1971 and 1980 who

had majored in the Industrial Arts Teacher Education option. These graduates were surveyed concerning the effectiveness of the program in meeting the needs of the graduates as they became employed.

A review of the related literature was conducted to determine the scope of research previously completed that relates to this study and to identify research strategies and specific procedures previously utilized in investigating similar problems. The review of related literature was divided into the following three topics to enhance the readability of this chapter:

1. The significance of graduate follow-up studies.
2. A review of previously conducted follow-up studies of graduates from industrial arts programs for the same period as the present study.
3. A summary of implications of the review of literature for this study.

Significance of Graduate Follow-Up Studies

The usefulness and necessity of follow-up studies of graduates from educational institutions is exemplified throughout the literature. Gay (1981) lists three reasons follow-up studies are conducted by educational institutions:

1. To internally or externally evaluate their instructional programs.
2. To seek objective information regarding the current status of their former students.

3. To obtain attitudinal and opinion data concerning the graduates' perceptions of the adequacy of their training (Gay, 1981).

According to Meeks (1980), Bettis stated that the fundamental changes in our educational institutions are a result of the utilization of graduate follow-up studies. Other researchers have indicated that the chief contributions of these surveys have been in the areas of justifying budgets, adding confidence to decision making, and demonstrating the need for the expansion of facilities (Jamrich and Dressel, 1961).

Surveys and studies of higher education have taken on increasing importance in recent years as the costs of and demands on education have increased sharply. These surveys have the purpose of providing evidence for the adequacy and effectiveness of an institution's endeavors (Jamrich and Dressel, 1961).

Follow-up studies serve the purpose of eliciting evaluative responses from former students in answering such questions as:

1. What training received by the graduates was important to them?
2. What training was unimportant?
3. What suggestions do the graduates have for improving the training they received (Meeks, 1980)?

With those specific guidelines toward high-quality questionnaire utilization in mind, the researcher of the present study conducted a survey of a number of previous industrial arts graduate follow-up studies.

Review of Follow-Up Studies Previously Conducted

The following is a review of 11 related studies, each covering the same general time period as the present study. In reviewing these studies, emphasis was given to the purpose, research procedures employed, and selected findings/conclusions.

A follow-up study of graduates, between the years 1973-1979, in Industry and Technology from East Texas State University was conducted by Lambert (1980). By utilizing a mailed questionnaire, the study sought from the graduates: (a) personal information, (b) information concerning courses offered by the department, (c) extent of additional education, and (d) information regarding the department, instruction, and physical facilities.

Lambert discovered that, of the responding graduates, 71.9 percent were employed in industry and 28.1 percent were employed in education. As a result, he felt the curriculum should be adjusted to allow more consideration for those graduates employed in industry.

Sixty percent of the respondents employed in industry and 56 percent of those employed in education chose not to express their views concerning course offerings, indicating to Lambert that the respondents were satisfied with the courses offered in the Industry and Technology Department. The respondents employed in industry and those employed in education differed only slightly in the types of courses most frequently taken. Metal Manufacturing Processes, Accident Prevention in Industry, and Engineering Graphics I were the courses most frequently taken by those graduates employed in industry,

whereas Engineering Graphics I, Wood Technology, and Accident Prevention in Industry were the courses most frequently taken by those employed in education.

Those respondents employed in industry proposed the addition of courses in the areas of industrial supervision, numerical control technology, and mechanics and strengths of construction materials, while those respondents employed in education indicated that they would like to see more courses offered in domestic architectural drawing and engineering graphics. Overall, the respondents in both groups indicated that the Industrial and Technology curriculum at East Texas State University was satisfactory and was meeting their needs in terms of their present employment, with those employed in education being more satisfied with their training than those employed in industry.

In another study, Patterson (1980) conducted a follow-up of graduates from the Elizabeth City State University in North Carolina having a major in Industrial Arts Teacher Education. This study was designed to assess the relevance/adequacy of this program to effectively prepare teachers in industrial arts. The research procedure involved performing a needs assessment with the following objectives serving as guidelines: (a) to build a data base for performing a needs assessment, (b) to assess the Elizabeth City State University Industrial Arts Program, (c) to identify possible implications for curriculum revision, and (d) to provide information for decision making.

After developing these guidelines, Patterson compiled a listing of the University's industrial arts graduates from 1964-1978. These graduates were identified and their place of employment was established along with the names of their administrators/employers. Identical questionnaires were mailed to both the graduates and their administrators/employers. The survey instrument sought to obtain and identify curricula content from seven other industrial arts programs located in the southeastern United States and to compare those programs with the one at Elizabeth City State University. After a preliminary evaluation was made of the Elizabeth City State University curriculum, a five-member committee was selected to evaluate the conclusions and recommendations drawn from the study and to assist the researcher in determining the adequacy of the preparation of Elizabeth City State University graduates and analyzing data needed for updating the Industrial Arts program.

Data obtained from the graduates in the study revealed that 76 percent had entered the Elizabeth City State University Industrial Arts program as freshmen. The reason most frequently given by beginning freshmen for majoring in industrial arts was previous exposure to industrial arts courses. Of these graduates, 75 percent were employed in junior and senior high schools. Sixty-five percent of the respondents were industrial arts teachers. Thirty-five percent of the graduates were working toward the Master's degree while 16 percent had already earned this degree.

Of the administrators/employers, 97 percent indicated that Elizabeth City State University graduates who were employed by them

had obtained adequate educational preparation for performing the jobs for which they were employed. In addition, the graduates had exhibited above-average job preparation skills, professionalism, discipline, and classroom control. The administrators/employers felt that the graduates needed additional educational preparation in project development, organization, inventory control, laboratory management, and oral and written communication.

The comparison of the Elizabeth City State University curriculum with that of the seven selected institutions in the Southeast revealed that the general studies courses and the majority of professional education and technical courses required by the selected institutions were basically the same as those required by Elizabeth City State University.

A follow-up study of the 1970-1977 Industrial Arts graduates of the five state universities in Mississippi was conducted by Mott (1979). The primary purpose of this study was to answer the following questions:

1. To what extent do the graduates perceive the industrial arts curriculum as having prepared them for initial teaching employment?
2. To what extent do the graduates perceive the objectives of industrial arts teacher education as having been achieved?
3. To what extent do the graduates perceive the objectives of the professional education curriculum as having been achieved?

4. What are the perceptions of the graduates concerning the various courses of the industrial arts program?

Subjects for this study were selected by random stratified sampling. The population consisted of graduates of the Industrial Arts Teacher Education programs from the five state universities of Mississippi. Of the questionnaires returned, 65 percent were acceptable for the purpose of representing the graduates who were teaching industrial arts.

The findings of the study revealed that the majority of the graduates who responded had entered the teaching profession. Of those teaching respondents, the majority were employed at the junior or senior high school level and were teaching industrial arts only. Mott concluded from these results that the Industrial Arts Teacher Education programs of the five state universities were adequately preparing their graduates for initial teaching employment.

The graduates' evaluation of the major objectives of Industrial Arts Teacher Education indicated that the greatest level of achievement was gained through those objectives related to the understanding of individual potential and relating this potential to the industrial-technical fields, and to develop skills in the proper use of tools, machines, and processes.

According to the data, the majority of graduates developed "adequate preparation" in the following professional education objectives: (a) to understand and accept responsibility toward the ethics of the teaching profession, (b) to provide the opportunity for awareness of and familiarity with available instructional materials,

and (c) to provide the opportunity for developing skills in methods and techniques of teaching.

Information gained from the data revealed that the majority of the teaching graduates rated the following six courses as having "high value": (a) Mechanical Drawing, (b) Industrial Planning, (c) Senior Project, (d) Woodworking, (e) Engineering Drawing, and (f) Observation and Directed Teaching. The following courses were rated lowest by the respondents: (a) Metrics, (b) Power Transmission, (c) Electricity in the Home, (d) Adhesives and Finishes, and (e) Industrial Arts in the Elementary Grades. History of Industrial Education or History and Philosophy and Introduction to Vocational Education courses were rated as "high value" or "worthwhile" by the majority of the respondents. As a result of the suggestions made by the graduates to the Industrial Arts program, Mott recommended Industrial Mathematics, Light Building Construction, Wood Processing Technology, and Manufacturing as possible course additions.

An earlier follow-up study was conducted by Sorenson (1975) of the Industrial Arts graduates from 1965-1971 of San Diego State University of California. The study was designed to determine the effectiveness of the undergraduate Industrial Arts Teacher Education program and to ascertain the degree to which graduates would accept and take courses in a technology program. A mailed questionnaire was used to obtain data in the following areas: personal information, employment since graduation, acceptance of a technology program, suggestions for improvement of the Industrial Arts program, and the value of technical courses in current occupational duties.

The findings revealed that most of the respondents resided in California prior to entering college and had continued to reside there following graduation. Due primarily to the community college system in California, approximately 80 percent of the respondents transferred from another college or university in San Diego County. The majority of the respondents transferred the equivalent of from two to two and one-half years of college credit.

The academic minors most valuable to the graduates employed in education were mathematics and art while psychology and mathematics were most valuable to those employed outside of education. Technical areas of emphasis most often chosen during the undergraduate program were woods, metals, drawing, and power mechanics. These same areas were also the ones most often taught by graduates employed in education. The majority of respondents who were in education were teaching in a unit shop in a junior or senior high school.

Comments by the respondents in education suggested that the major reason for leaving teaching was low salaries. The competencies in the area of woods were most frequently selected as important and used by those in education whereas the competencies in the area of metals were most frequently selected as important and used by those respondents outside of education. One of the significant conclusions of this study was the strong feelings of the respondents toward earlier teaching type experiences. The respondents in education felt that students need to become involved in the teaching process much sooner and should learn to handle more appropriately the practical aspects of teaching in a controlled situation.

With the exception of graphic arts, the respondents were generally satisfied with the curriculum offerings of the Industrial Arts Department both for educational and non-educational positions. Over forty percent of the respondents entered industry after graduation, and, once employed outside of education, the graduates did not enter the educational field.

Wold (1974) conducted a follow-up study to evaluate the Industrial Arts program at Indiana State University. By surveying those graduates of the Industrial Arts Teacher Education program, he sought to relate their professional needs toward possible curriculum modifications. The objectives of the study were to determine the types of positions held by the graduates and the degree of importance placed on course content in Industrial Arts Education.

The data were collected with a mailed questionnaire sent to graduates who earned a Bachelor of Science degree between August 1960 and August 1970. The findings were arranged according to the status of the graduates and the importance placed on instructional concepts. The majority of the graduates who were employed in education indicated high school (grades 9-12) as the occupational classification and the area-unit-instructional laboratory as the area of instruction.

There was common agreement among the educational occupational classifications and area of work regarding the importance of professional education instructional concepts. Fundamentals of laboratory management was the professional education instructional concept ranked highest by the graduates employed in education. The

fundamentals of woodworking, basic metalworking processes, and fundamentals of technical drawing were the technical education instructional concepts ranked highest in the educational occupational classification. An evaluation of data by area of work revealed that the instructional concepts directly identified with a laboratory had the highest percent of "essential" or "desirable" responses.

Miller (1973) surveyed the curriculum for the Department of Industrial Technology at Southeastern Louisiana State University by utilizing a survey and opinionnaire of the graduates of the program from 1956-1971. The purposes of this study were to ascertain the professional status and location of the graduates, to analyze the effectiveness of the training they received through course offerings in the department, and to furnish data for use by university authorities.

The findings revealed that, although the graduates were located in 21 states, two foreign countries, and one commonwealth, 77 percent resided in Louisiana. This university was selected by the majority of the graduates because of the cost factor, proximity to their home, and quality of the technology and education programs. At the time of this study, 5.38 percent of the respondents had earned an advanced degree and 6.54 percent were enrolled in a graduate program.

Generally, graduates had taken, and rated of "maximum" or "considerable" value, courses in drafting, electricity and electronics, metals, basic woods, fluid and power mechanics, occupational analysis, and industrial safety. Graduates expressed the need for additional preparation in varied technical areas, mathematics,

physical science, and technical writing. The respondents considered nine of 12 departmental objectives "excellent" or "adequate." Improvement was indicated for the study of occupational information, the relationship of technical information to specific areas, and the need for motivation to study professional literature.

In a similar study, the purpose of which was to aid in developing an improved industrial educational program, Diedrick (1971) surveyed the graduates of The Iowa State University in order to determine recommended course emphasis. The major objectives of this study were to group the graduates according to factors relating to their occupational classification and specific area of work, to determine the degree of importance placed on course content, and to determine the necessary course content in order to enable the graduates to meet the needs of various occupations.

The data were collected by using a mailed questionnaire, the findings of which were arranged according to status of the graduates and importance placed on course content. Of the respondents, 46 percent reported employment in education while 54 percent reported employment in industry.

The graduates in industry were employed most frequently by manufacturing firms, with supervision being the area of work most often reported. Those graduates employed in education reported most frequently that they were teaching in an area-unit laboratory at the high school level.

Evaluations of course-content were grouped according to industry and educational classifications, occupational groups, and areas

of work. Those areas evaluated "essential" or "important" by both industry-option and teacher-option graduates were fundamentals of algebra, fundamentals of trigonometry, and communication skills. More respondents who were employed in education rated industrial education "needed" than did respondents employed in industry. The elements of the content of the teaching methods courses, in order of importance, were listed as follows: (a) determining course content, (b) developing competency in the area of teaching, (c) developing courses, (d) selecting and caring for equipment, (e) evaluating student progress, (f) understanding the teacher's role, (g) planning lessons, (h) preparing a budget, and (i) understanding public relations.

A follow-up study of the Industrial Arts Teacher Education program at Black Hills State College, South Dakota, was conducted by Edwards (1971). The major purposes of the study were to obtain status data of those who graduated with a major in industrial arts during the years 1960-1969 and to evaluate the importance of the basic elements of the industrial arts courses.

Data for this study were obtained by use of a mailed questionnaire. The findings indicated that the majority of the graduates resided outside South Dakota. Of the respondents, 75 percent were employed in the field of education with very few of them having changed occupations.

Since almost one-half of the graduates had received or were pursuing an advanced degree, Edwards concluded that their experiences during their undergraduate work were compatible with continued

education. In that almost one-half of the graduates had taken additional specialized courses in the areas of electricity/electronics, professional, and metals, it was concluded that there was a lack of adequate training in these areas. Based, in part, on these perceived inadequacies, Edwards recommended that the areas of ceramics, electricity/electronics, graphic arts, metals, power and transportation, and textiles be represented, expanded, and improved. In performing the responsibilities of their positions, the graduates placed most importance on the basic elements of the professional area followed by electricity/electronics, drafting, woodworking, and metals. Finally, the perceived advantage, by the graduates, of a career in industrial arts was that the content was based on human needs, e.g., the need to create, explore, manipulate, excel, and beautify.

In another follow-up study, Weiner (1971) evaluated the total Industrial Arts Teacher Education curriculum at Peru State College, Indiana, to determine its adequacy in preparing graduates for meeting their practicing needs as teachers. Identical questionnaires were mailed to both the graduates of the Industrial Arts Teacher Education curriculum and to the administrators of the graduates employed in public schools.

Findings showed that the majority of the graduates gave an above-average rating to the industrial arts objectives, goals, and courses, indicating that the curriculum was adequately preparing the teacher education graduate to meet most of the practicing needs encountered in teaching industrial arts.

In order to improve the curriculum, the majority of the graduates suggested the need to lengthen the period of student teaching. The graduates' evaluation of general education courses indicated that the courses rated highest were those for which the student could perceive a future need. These courses included: speech, mathematics, English composition I, health, and English composition II. Those courses for which the graduates were unaware of a future need included: music appreciation, art appreciation, world civilization, physics, and chemistry.

A survey of Industrial Arts Teacher Education and Technical/Technology graduates at Murray State College, Kentucky, was conducted by Winters (1971). The purpose of this study was to collect data in order to determine the status and effectiveness of the Industrial Arts Teacher Education and the Industrial Technical/Technology programs.

Data for this study were obtained by use of a mailed questionnaire. The survey sought information pertaining to personal and background information, occupation, analysis of curriculum effectiveness, and evaluation of the adequacy of the Industrial Education program.

Findings of the study showed that approximately two-thirds of the teacher education respondents had taken industrial arts courses in high school as compared with 55.6 percent of the Technical/Technology respondents. Of all the respondents, the three most commonly taken high school courses were drafting, woods, and general shop. Ninety-one percent of the teacher education respondents had

either completed, were working toward, or indicated they planned to begin an advanced degree program as compared with 63 percent of the Technical/Technology respondents. Continued education, for both groups, was primarily in the area of industrial education. A majority of the teacher education respondents indicated that they were teaching industrial arts either full or part-time and at the high school level, and were devoting a high percentage of their time to teaching in the areas of woods, drafting, and general shop. Of the Technical/Technology respondents, the majority indicated that they were in positions most closely related to industrial engineering, and were employed by manufacturing and production industries.

The major recommendations for curriculum improvements or changes by the teacher education respondents were the addition of courses in power and automobile mechanics and industrial management and methods, and greater emphasis placed in the area of plastics; whereas the recommendations by the Technical/Technology respondents were the addition of power and automobile mechanics, and changes in industrial management and other industrial functions. In evaluating their undergraduate program relative to fulfilling stated departmental objectives, approximately 75 percent of each category of respondents indicated excellent or adequate preparation.

It was concluded that the Industrial Arts Teacher Education program and the Technical/Technology program were compatible and could be operated within the same department without having adverse effects upon each other.

In the last study reviewed, Gifford (1970) conducted a follow-up of graduates of South Dakota State University with a major in Industrial Arts Teacher Education. The purpose of this study was to evaluate the undergraduate Industrial Arts program. Data for this study were obtained by questionnaires mailed to the industrial arts graduates and to South Dakota secondary public school administrators.

Findings of the study revealed that 53 percent of the industrial arts graduates were employed as educators, with the most prevalent teaching areas being woodworking, metalworking, drafting, and electricity/electronics, respectively. Low salary and disciplinary problems were listed most often as reasons for leaving or not entering the teaching profession. Over one-half of the respondents had increased their educational status by working toward and/or having earned advanced degrees. The respondents considered woodworking, cabinet-making, carpentry, and engineering graphics as being the "most valuable" courses in their undergraduate program, while science, physical education, and mathematics were considered to be the "most valuable" academic minors.

Electricity/electronics, plastics, and an expanded metals program were given as needs for improving the undergraduate curriculum. In addition, it was concluded that a need exists for expansion and revision of the professional area for the undergraduate student with the possibility of adding courses in organization, administration, and evaluation of industrial arts.

Summary of Implications of the Review of Literature for This Study

Follow-up studies of graduates from educational institutions are conducted in order to determine the status of the graduates and their perceptions of the adequacy of their formal training (Gay, 1981).

The following similarities became apparent as a result of a comparison of each of these 11 follow-up studies. All of the studies surveyed bachelor level industrial arts and technology programs in state-supported colleges or universities and utilized a mailed questionnaire as the device for the collection of data.

Mott, Sorenson, Edwards, and Gifford reported that the majority of their respondents were employed in education, while Lambert and Diedrick reported that the majority of their respondents had entered or were working in industry. Of those responding graduates who reported employment in education, studies by Patterson, Mott, Wold, Diedrick, Winters, and Gifford indicated that the majority were teaching industrial arts at the junior or senior high school level. Winters and Gifford reported that the three areas most frequently taught by the respondents in education were woods, metals, and drafting, respectively.

In the studies reporting additional education beyond the baccalaureate level, Patterson, Miller, and Edwards reported that less than one-half of the respondents in their respective studies were working toward or had earned advanced degrees and Miller

reported that only 12 percent of his respondents had done so at the time of the study. A majority of respondents in the studies by Winters and Gifford were working toward, had earned, or planned to pursue an advanced degree. It was interesting to note that Winters reported that 91 percent of the teacher education respondents were working toward, had earned, or planned to pursue an advanced degree, and that the majority of the respondents who had earned or were seeking advanced degrees were majoring in industrial education.

The studies conducted by Lambert, Mott, Sorenson, Miller, and Edwards evaluated the courses taken by the respondents in their respective undergraduate programs. The respondents who were employed in industry in both Lambert's and Sorenson's studies indicated a preference toward courses in metals, safety, and engineering graphics as being of value in their present occupation, whereas respondents employed as teachers in each of these five studies indicated wood-working and mechanical drawing as the courses having most value in their present occupations.

In the area of suggested course additions, program recommendations, and levels of satisfaction with preparation, Sorenson and Weiner recommended that students in teacher education become involved in the teaching process much sooner and Weiner specifically suggested that the period of student teaching be lengthened. Six of the studies recommended improvement and expansion of the existing technical courses. Lambert, Mott, Sorenson, Miller, and Weiner each reported that, overall, the graduates they surveyed were

generally satisfied with their undergraduate preparation and had found it to be adequate as related to their occupations at the time of these studies.

In conclusion, although these related studies were of specific programs, they have a number of similarities to the present study.

Some of the most important similarities include:

1. Identification of occupational status.
2. Determination of the amount of additional education pursued.
3. Perception of the advantage of a career in industrial arts.
4. Assessment of the effectiveness of industrial arts programs.
5. Evaluation of courses offered by industrial arts departments.
6. Suggestions of courses for improving industrial arts programs.
7. Provisions of possible implications for curriculum revision.
8. Provision of information for decision making.

CHAPTER III

METHODS OF PROCEDURE

In order to assess the effectiveness of an educational program, one procedure used is a follow-up study of graduates' perceptions of program adequacy. In the present study, recent graduates having the Industrial Arts option of the Industrial Education program were contacted to provide the evaluative information required to determine whether or not departmental objectives were being achieved and to identify strengths and weaknesses of the existing curriculum.

Population and Methodology

Graduates awarded the Bachelor of Science degree in Industrial Education with the Industrial Arts Teacher Education option at The University of Tennessee, Knoxville, between August 1971 and July 1980 were the population for this study. As the division of Industrial Education has four options--Industrial Arts, Health Occupations, Trade and Industry, and Training and Supervision---the Industrial Arts option graduates make up only a portion of the total graduates in the Industrial Education division. The University of Tennessee, Knoxville, Office of Admissions and Records maintains transcripts of its graduates from Industrial Education as its smallest division. To separate the Industrial Arts Teacher Education majors from those majoring in one of the other three options, it was necessary for the researcher to actually review individual transcripts. After this

review was completed, the list of individuals graduating with the Industrial Arts option was submitted to selected Industrial Education faculty members. This procedure helped verify those individuals graduating during the ten-year period selected for the study. There were 396 Industrial Education graduates during that period. Quarterly graduation records and the Registrar's Transcript Services showed that 86 of those 396 students had graduated with the Industrial Arts option. Addresses provided by the Office of the Registrar were cross-referenced with those in the Alumni Office to provide the most recent addresses. Due to the population size, a census survey was conducted. Of those 25 graduates who did not return a completed questionnaire, mailed returns were received from eight who had moved and had left no forwarding address or whose forwarding address had expired. One questionnaire was returned by a parent who reported that one of the graduates was deceased. Sixty-one graduates responded to the survey for a 79 percent return.

The Instrument

Before the actual construction of the survey instrument, the objectives of the study were considered in order for the instrument to be valid for this study. Sections comprising the instrument included present occupations of the graduates, educational accomplishments of the graduates, graduate evaluation of industrial arts courses, and personal evaluation and recommendations for improvements in the Industrial Arts program. In addition, a list of specific

departmental topics was developed using the undergraduate catalog and syllabus.

The questionnaire was then organized in its preliminary form and submitted as a pilot study to a group of Industrial Education graduate students and faculty members for comments and criticisms. Revisions were again made and the instrument was then submitted to the Industrial Arts faculty at The University of Tennessee, Knoxville, for approval. Upon acceptance by the Industrial Arts faculty, the instrument was then submitted to the Human Subjects Committee and the Graduate School for final critique and approval. After the necessary revisions were made, the final questionnaire was printed (Appendix A).

Data Collection

The survey instrument was mailed to each individual who had graduated with the Industrial Arts option in Industrial Education. Included with the questionnaire were the following:

1. A cover letter (Appendix B).
2. A participatory consent form (Appendix C).
3. A self-addressed, stamped envelope.

The graduates were asked to sign the consent form and complete the questionnaire and return both by mail as soon as possible, using the envelope provided. Upon receipt, the questionnaires were coded. A check-off sheet was used to indicate which graduates had returned the completed instrument.

Three weeks following the mailing of the material to the graduates, 20 percent of the population had completed and returned the questionnaire and the participatory consent form. At this time, another packet of material identical to the first was sent to each of the graduates who had not responded.

Three weeks following the mailing of the second packet, a total of 40 percent of the graduates had completed and returned the questionnaire and the participatory consent form. At this time, a follow-up reminder (Appendix D) was sent to each of the graduates who had not yet responded.

Three weeks following the mailing of the first follow-up reminder, a total of 67 percent of the graduates had completed and returned the questionnaire and the participatory consent form. A second follow-up reminder (Appendix E) was then sent to those graduates who had not responded.

Three weeks following the second follow-up reminder, a total of 74 percent of the graduates had responded. At this point, the Alumni Office was contacted to learn of any address changes and to procure addresses of parents of those nonrespondents. No address changes had been received. As a result, a packet of material was sent to each of the nonrespondents using the parents' address.

One week later, a list of those graduates who had not responded was submitted to the researcher's major professor in an attempt to locate them through any contacts they may have had with the departmental faculty. As a result, an additional five graduates were located and each was mailed a survey instrument and

consent form. All of these graduates responded to the questionnaire, helping to bring the total number of respondents to 61, or 79 percent. Of the questionnaires returned, 58 (74 percent of the graduates) were usable for data analysis.

Treatment and Analysis of the Data

As each completed questionnaire was received, quantitative data were coded and computed using the Statistical Package for the Social Sciences (SPSS). All written responses were tabulated and presented in narrative form in the report of this research. Computer analysis included frequencies, percentages, measures of central tendency, cross tabulations, and, where appropriate, comparisons between groups.

Summary

Chapter III contains a description of the population and investigative activity undertaken in this study. The development of the survey instrument, data gathering procedures utilized, and methods of analyzing the data are described.

CHAPTER IV

ANALYSIS OF DATA

This chapter contains the analysis of the data collected from the 58 usable questionnaires received from the graduates who had majored in the Industrial Arts Teacher Education option at The University of Tennessee, Knoxville. The questionnaires were designed to ascertain the effectiveness of the program in meeting the needs of the graduates who were employed in education. Specifically, it attempted to determine the graduates' geographic location, occupational status, pursuit of additional education, perceived value of the industrial arts courses, and perceived advantages of a career in industrial arts, and to obtain suggestions for improving the Industrial Arts program in question.

Geographic Location

Table 1 contains the number and percentages of respondents according to state of residence. Of the respondents, 47 (81.0 percent) were located in Tennessee and 53 (91.4 percent) were located in the southeastern United States. Table 2 indicates that, of those respondents employed in education, 19 (86.4 percent) were located in Tennessee and three (13.6 percent) were located outside the state. Of those respondents employed outside of education, 28 (77.8 percent) were located in Tennessee while eight (22.2 percent) were residing outside the state.

Table 1. Geographic Location of Respondents.

Location	Frequency	Percent
Tennessee	47	81.0
Georgia	3	5.3
Texas	2	3.5
Colorado	1	1.7
North Carolina	1	1.7
Pennsylvania	1	1.7
Louisiana	1	1.7
South Carolina	1	1.7
California	1	1.7
Total	58	100.0

Table 2. Geographic Location of Respondents Employed In Education and Respondents Employed Outside of Education.

Location	Area of Employment				Total	
	In Education		Outside of Education			
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Tennessee	19	86.4	28	77.8	47	81.0
Outside of Tennessee	<u>3</u>	<u>13.6</u>	<u>8</u>	<u>22.2</u>	<u>11</u>	<u>19.0</u>
Total	22	100.0	36	100.0	58	100.0

Present Occupations

Distribution of Respondents

Table 3 reflects the distribution of the respondents by educational and non-educational employment. Of those respondents, 22 (37.9 percent) were employed in education and 36 (62.1 percent) were employed in areas outside of education, indicating that the majority of respondents were employed in occupations outside of education.

Educational Positions

Of those respondents employed in educational positions (Table 4), 14 (63.7 percent) were teaching industrial arts only, two (9.1 percent) were teaching industrial arts and other subjects, one (4.5 percent) was teaching industrial arts and working in administration, and two (9.1 percent) were working in administration only.

Table 5 lists courses that were currently being taught by the industrial arts teachers. The most frequently taught course was woodworking, taught by 55 percent of the respondents, followed by metalworking (40 percent) and drafting (30 percent).

Non-Educational Positions

Of those respondents employed in non-educational positions (Table 6), 15 (41.7 percent) were employed in industry, 12 (33.3 percent) were employed in private business, while nine (25.0 percent) were employed in other non-educational positions. A list of positions held by the respondents employed in each of these non-educational areas are shown in Tables 7, 8, and 9.

Table 3. Distribution of Respondents By Educational and Non-Educational Employment.

Area of Employment	Frequency	Percent
In Education	22	37.9
Outside of Education	<u>36</u>	<u>62.1</u>
Total	58	100.0

Table 4. Educational Positions of Respondents By Title.

Title	Frequency	Percent
Teacher of Industrial Arts Only	14	63.7
Teacher of Industrial Arts and Other Subjects	2	9.1
Teacher of Industrial Arts/Administrator	1	4.5
Administrator Only	2	9.1
Other Educator	<u>3</u>	<u>13.6</u>
Total	22	100.0

Table 5. Courses Currently Being Taught By Industrial Arts Teachers.

Course Title	Frequency	Rank	Percent
Woodworking	11	1	55.0
Metalworking	8	2	40.0
Drafting	6	3	30.0
General Shop	4	4	20.0
Plastics	4	4	20.0
Manufacturing Processes	2	5	10.0
Electricity/Electronics	2	5	10.0
Power Mechanics	2	5	10.0
Mathmatics	2	5	10.0
Language Arts	2	5	10.0
Communications	1	6	5.0
Safety	1	6	5.0
Construction	1	6	5.0
Welding	1	6	5.0
Graphic Arts	1	6	5.0
Home Maintenance	1	6	5.0
Career Education	1	6	5.0
Social Studies	1	6	5.0
Science	1	6	5.0
Health	1	6	5.0
Reading	1	6	5.0

Table 6. Non-Educational Positions of Respondents By Area.

Area	Frequency	Percent
Industry	15	41.7
Private Business	12	33.3
Other/Non-Educator	<u>9</u>	<u>25.0</u>
Total	36	100.0

Table 7. Positions Held By Respondents in Industry.

Position	Frequency	Percent
Supervisor	3	20.0
Coordinator	2	13.3
Engineering Assistant	2	13.3
Estimator	2	13.3
Maintenance Personnel	2	13.3
Manager	1	6.7
Model Maker	1	6.7
Sales	1	6.7
Superintendent	<u>1</u>	<u>6.7</u>
Total	15	100.0

Table 8. Positions Held By Respondents in Private Business.

Position	Frequency	Percent
Construction/Sales	4	33.4
Machinist	2	16.7
Technician	2	16.7
Analyst/Programmer	1	8.3
Dentist	1	8.3
Estimator	1	8.3
Kennel Operator/Policeman	<u>1</u>	<u>8.3</u>
Total	12	100.0

Table 9. Positions Held By Respondents in Other Non-Educational Areas.

Position	Frequency	Percent
Human Services	4	44.5
Student	2	22.2
Coach	1	11.1
Military	1	11.1
Supervisor	<u>1</u>	<u>11.1</u>
Total	9	100.0

Educational Pursuits

The third major area of data analysis focuses on educational pursuits of the graduates beyond the attainment of the baccalaureate degree. Table 10 shows that 20 (34.5 percent) of the respondents in the study had received one or more advanced degrees, while 16 (27.6 percent) were working toward an advanced degree at the time of this study.

Type of Advanced Degree

Table 11 indicates that, of those who had earned an advanced degree, 16 (80.0 percent) had received the Master's degree, three (15.0 percent) had received the Education Specialist degree, and one (5.0 percent) had received the Doctorate.

Sixteen respondents were working toward advanced degrees, 12 (75.0 percent) of whom were working toward the Master's degree, one (6.3 percent) was working toward the Education Specialist degree, and three (18.7 percent) were working toward the Doctorate.

Institutions of Graduate Studies

Of the respondents in the study who had earned advanced degrees (Table 12), 17 (85.0 percent) received their degree from The University of Tennessee, Knoxville. The other three institutions conferring degrees included Middle Tennessee State University; The University of Tennessee Center for the Health Sciences, Memphis; and Webster College. Similarly, 15 (88.2 percent) of the 17

Table 10. Educational Pursuit By Area of Employment.

Area of Employment	Additional Educational Pursuit						No Additional Educational Pursuit			
	Had Earned		Working Toward		Total		Pursuit		Total	
	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent
In Education	9	40.9	8	36.4	17	77.3	5	22.7	22	100.0
Outside of Education	<u>11</u>	<u>30.6</u>	<u>8</u>	<u>22.2</u>	<u>19</u>	<u>52.8</u>	<u>17</u>	<u>47.2</u>	<u>36</u>	<u>100.0</u>
Total	20	34.5	16	27.6	36	62.1	22	37.9	58	100.0

Table 11. Type of Advanced Degree By Pursuit of Additional Education By Those Employed In Education and Those Employed Outside of Education.

Type of Advanced Degree	Had Earned						Working Toward						Total					
	Employed in		Employed		Outside		Employed in		Employed		Outside		Employed in		Employed		Outside	
	Education		Education		Education		Education		Education		Education		Education		Education		Education	
	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent
Masters	7	77.8	9	82.0	16	80.0	7	87.5	5	62.5	12	75.0	14	82.4	14	73.7	28	77.8
Specialist	2	22.2	1	9.0	3	15.0	0	0	1	12.5	1	6.3	2	11.8	2	10.5	4	11.1
Doctorate	<u>0</u>	<u>0</u>	<u>1</u>	<u>9.0</u>	<u>1</u>	<u>5.0</u>	<u>1</u>	<u>12.5</u>	<u>2</u>	<u>25.0</u>	<u>3</u>	<u>18.7</u>	<u>1</u>	<u>5.8</u>	<u>3</u>	<u>15.8</u>	<u>4</u>	<u>11.1</u>
Total	9	100.0	11	100.0	20	100.0	8	100.0	8	100.0	16	100.0	17	100.0	19	100.0	36	100.0

Table 12. Institutions Conferring Degrees By Type of Degree of Those Respondents Employed In Education and Those Employed Outside of Education Who Have Earned Advanced Degrees.

Institution	Employed in Education								Employed Outside of Education								Total	
	Masters		Specialist		Doctorate		Total		Masters		Specialist		Doctorate		Total		Total	
	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent
The University of Tennessee, Knoxville	7	100.0	2	100.0	0	0	9	100.0	8	88.9	0	0	0	0	8	72.7	17	85.0
Middle Tennessee State University	0	0	0	0	0	0	0	0	0	0	1	100.0	0	0	1	9.1	1	5.0
The University of Tennessee Center for the Health Sciences, Memphis	0	0	0	0	0	0	0	0	0	0	0	0	1	100.0	1	9.1	1	5.0
Webster College	0	0	0	0	0	0	0	0	1	11.1	0	0	0	0	1	9.1	1	5.0
Total	7	100.0	2	100.0	0	0	9	100.0	9	100.0	1	100.0	1	100.0	11	100.0	20	100.0

respondents who were working toward advanced degrees at the time of this study were enrolled at The University of Tennessee, Knoxville (Table 13).

Major Areas of Advanced Study

Table 14 presents the major areas of study of those respondents who were working toward advanced degrees. Of those 16 respondents, one (6.3 percent), who was employed in education, was working toward a Master's degree in Administration; two (12.5 percent) were working toward a Master's degree in Education, one of whom was employed in education and one employed outside of education. Two (12.5 percent) respondents were pursuing a Master's degree with a major in Industrial Arts, one of whom was employed in education and one employed outside of education. There were three (18.7 percent) respondents, all of whom were employed in education, who were pursuing a Master's degree in Industrial Education. Safety Education was selected as the major by three (18.7 percent) respondents, all of whom were employed outside of education. Two of these advanced degrees were at the Master's level and the other was an Education Specialist degree. Three (18.7 percent) respondents were pursuing a Doctorate with a major in Vocational-Technical Education, two of whom were employed outside of education and one employed in education.

Reasons for Pursuing Advanced Education

The primary reasons for pursuing additional education, as indicated by the respondents in this study, are shown in Table 15.

Table 13. Institutions in Which Respondents Were Enrolled By Type of Degree of Those Employed In Education and Those Employed Outside of Education Who Were Working Toward Advanced Degrees.

Institution	Employed in Education								Employed Outside of Education								Total	
	Masters		Specialist		Doctorate		Total		Masters		Specialist		Doctorate		Total			
	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent		
The University of Tennessee, Knoxville	5	71.4	0	0	1	100.0	7	78.8	5	100.0	1	100.0	2	100.0	8	100.0	15	88.2
University of Georgia	1	14.3	0	0	0	0	1	11.1	0	0	0	0	0	0	0	0	1	5.9
Unspecified	<u>1</u>	<u>14.3</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>11.1</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>5.9</u>
Total	7	100.0	0	0	1	100.0	9	100.0	5	100.0	1	100.0	2	100.0	8	100.0	17	100.0

Table 14. Major Area of Study By Type of Degree of Those Respondents Employed In Education and Those Employed Outside of Education Who Are Working Toward Advanced Degrees.

Major Area of Study	Employed in Education								Employed Outside of Education								Total	
	Masters		Specialist		Doctorate		Total		Masters		Specialist		Doctorate		Total		Total	
	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent
Administration	1	14.3	0	0	0	0	1	12.5	0	0	0	0	0	0	0	0	1	6.3
Education	1	14.3	0	0	0	0	1	12.5	1	20.0	0	0	0	0	1	12.5	2	12.5
Education, Adminis- tration, and Supervision	0	0	0	0	0	0	0	0	1	20.0	0	0	0	0	1	12.5	1	6.3
Industrial Arts	1	14.3	0	0	0	0	1	12.5	1	20.0	0	0	0	0	1	12.5	2	12.5
Industrial Education	3	42.8	0	0	0	0	3	37.5	0	0	0	0	0	0	0	0	3	18.7
Safety Education	0	0	0	0	0	0	0	0	2	40.0	1	100.0	0	0	3	37.5	3	18.7
Vocational-Technical Education	0	0	0	0	1	100.0	1	12.5	0	0	0	0	2	100.0	2	25.0	3	18.7
Non-Declared	<u>1</u>	<u>14.3</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>12.5</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>6.3</u>
Total	7	100.0	0	0	1	100.0	8	100.0	5	100.0	1	100.0	2	100.0	8	100.0	16	100.0

Table 15. Primary Reasons for Pursuing Additional Education By Those Respondents Employed In Education and Those Employed Outside of Education.

Reason	Employed in Education			Employed Outside of Education			Total		
	Freq.	Rank	Percent	Freq.	Rank	Percent	Freq.	Rank	Percent
To Provide Personal Satisfaction	3	3	9.1	8	1	21.6	11	1	15.6
To Prepare for a New Position	3	3	9.1	6	2	16.2	9	2	12.9
To Overcome Inadequacies in Previous Preparation	2	4	6.1	1	4	2.7	3	4	4.3
To Maintain and/or Improve Competency for Present Position	4	2	12.1	5	3	13.6	9	2	12.9
To Qualify for an Increment on the Salary Schedule	8	1	24.2	0	0	0	8	3	11.4
Other	4		12.1	3		8.1	7		10.0
Does Not Apply	3	0	9.1	6		16.2	9		12.9
No Response	<u>6</u>	-	<u>18.2</u>	<u>8</u>	-	<u>21.6</u>	<u>14</u>		<u>20.0</u>
Total	33		100.0	37		100.0	70		100.0

Overall, the reason ranked as number one for pursuing additional education was: "To provide personal satisfaction." This reason was also ranked as number one by those respondents employed outside of education. The reason ranked as number one by those respondents employed in education was: "To qualify for an increment on the salary schedule." "To prepare for a new position" and "To maintain and/or improve competency for present position" were each ranked second overall, and were ranked second and third, respectively, by those employed outside of education. Those employed in education reversed this order by ranking "To maintain and/or improve competency for present position" as second and "To prepare for a new position" as third. Also, ranked as third by those employed in education was "To provide personal satisfaction." "To overcome inadequacies in previous preparation" was ranked last by both those respondents employed in education and those employed outside of education, indicating that, overall, the respondents were adequately prepared in their undergraduate studies.

Employment Requirements

Table 16 shows the distribution of responses to the question, "Was this education required by your employer?" Of the 58 respondents, 12 indicated that the additional education pursued was required, whereas 28 indicated that it was not required. Eighteen of the participants did not respond to the question. Of those whose advanced education was required, eight (66.7 percent) were employed in education and four (33.3 percent) were employed outside

Table 16. Responses to: "Was This Education Required By Your Employer?" for Those Employed In Education and Those Employed Outside of Education.

Response	Employed In Education		Employed Outside of Education		Total	
	Freq.	Percent	Freq.	Percent	Freq.	Percent
Yes	8	66.7	4	33.3	12	100.0
No	8	28.6	20	71.4	28	100.0
No Response	<u>6</u>	<u>33.3</u>	<u>12</u>	<u>66.7</u>	<u>18</u>	<u>100.0</u>
Total	22	37.9	36	62.1	58	100.0

of education. Conversely, eight (28.6 percent) of those who indicated that the additional education was not required were employed in education and 20 (71.4 percent) were employed outside of education.

Evaluation of Industrial Arts Courses

In the present section, a table for each of the 36 courses offered in the Industrial Arts program is provided. Each course is ranked according to degree of value, if the course had been taken; reason, if the course had not been taken; and whether or not there had been a felt need for the course since graduation. The courses included in the questionnaire for respondent feedback were arranged according to the chronological order of course numbers as presented in The University of Tennessee, Knoxville, catalog.

Courses Offered

Welding and cutting practices. Table 17 shows that there were 29 respondents who had taken this course. Of those employed in education who had taken this course, 66.7 percent rated it at the maximum value level, while the remaining 33.3 percent rated it as having had reasonable value. Of those respondents employed outside of education who had taken the course, 64.7 percent indicated that it had been of maximum value and 23.5 percent rated it as having had reasonable value. Overall, 93.1 percent of those respondents who had taken the course recognized it by placing it in the maximum or reasonable value categories.

Table 17. Rating of Welding and Cutting Practices By Respondents Employed In Education and By Those Employed Outside of Education.

Area of Employment	Course Taken				Course Not Taken				Number of Responses
	Maximum Value	Reasonable Value	Minimum Value	Total (N)	Conflict in Schedule	Saw No Need	Felt Need Since Graduation	Total (N)	
	----- Percent -----				-----				
In Education	66.7	33.3	0.0	100.0 (12)	33.3	33.3	33.4	100.0 (3)	15
Outside of Education	<u>64.7</u>	<u>23.5</u>	<u>11.8</u>	<u>100.0 (17)</u>	<u>28.6</u>	<u>42.8</u>	<u>28.6</u>	<u>100.0 (14)</u>	<u>31</u>
Total	65.6	27.5	6.9	100.0 (29)	29.4	41.2	29.4	100.0 (17)	46

Engine analysis. Table 18 indicates that 31 of the respondents had taken this course. Of those respondents employed in education who took the course, 30.0 percent rated it at a level of maximum value and 60.0 percent rated it of reasonable value. Of those employed outside of education who had taken the course, 52.4 percent indicated that it had been of maximum value and 23.8 percent identified it at a level of reasonable value. Overall, 80.7 percent of those respondents who had taken the course rated it in the categories of maximum or reasonable value.

Graphic communications. The data in Table 19 indicates that 39 respondents had taken this course. Of those who had taken this course and were employed in education, 85.7 percent rated it as having had maximum value, while the remaining 14.3 percent placed it at the reasonable value level. Of those employed outside of education who had taken this course, 68.0 percent rated it as having had maximum value and 20.0 percent determined it as having been of reasonable value. Overall, 92.3 percent of those respondents who had taken the course rated it as having had maximum or reasonable value.

Basic and applied electricity. There were 39 respondents who had taken this course (Table 20). Of those employed in education who took the course, 13.3 percent placed it in the category of maximum value and 60.0 percent rated it as having had reasonable value. Of those respondents who took the course and were employed outside of education, 29.2 percent indicated that it had been of

Table 18. Rating of Engine Analysis By Respondents Employed In Education and By Those Employed Outside of Education.

Area of Employment	Course Taken				Course Not Taken				Number of Responses
	Maximum Value	Reasonable Value	Minimum Value	Total (N)	Conflict in Schedule	Saw No Need	Felt Need Since Graduation	Total (N)	
	----- Percent -----				-----				
In Education	30.0	60.0	10.0	100.0 (10)	37.5	25.0	37.5	100.0 (8)	18
Outside of Education	<u>52.4</u>	<u>23.8</u>	<u>23.8</u>	<u>100.0 (21)</u>	<u>9.1</u>	<u>90.9</u>	<u>0.0</u>	<u>100.0 (11)</u>	<u>32</u>
Total	45.2	35.5	19.3	100.0 (31)	21.0	63.2	15.8	100.0 (19)	50

Table 19. Rating of Graphic Communications By Respondents Employed In Education and By Those Employed Outside of Education.

Area of Employment	Course Taken				Course Not Taken				Number of Responses
	Maximum Value	Reasonable Value	Minimum Value	Total (N)	Conflict in Schedule	Saw No Need	Felt Need Since Graduation	Total (N)	
	----- Percent -----				-----				
In Education	85.7	14.3	0.0	100.0 (14)	50.0	25.0	25.0	100.0 (4)	18
Outside of Education	68.0	20.0	12.0	100.0 (25)	0.0	100.0	0.0	100.0 (5)	30
Total	74.4	17.9	7.7	100.0 (39)	22.2	66.7	11.1	100.0 (9)	48

Table 20. Rating of Basic and Applied Electricity By Respondents Employed In Education and By Those Employed Outside of Education.

Area of Employment	Course Taken				Course Not Taken				Number of Responses
	Maximum Value	Reasonable Value	Minimum Value	Total (N)	Conflict in Schedule	Saw No Need	Felt Need Since Graduation	Total (N)	
	----- Percent -----				-----				
In Education	13.3	60.0	26.7	100.0 (15)	0.0	33.3	66.7	100.0 (3)	18
Outside of Education	29.2	37.5	33.3	100.0 (24)	0.0	75.0	25.0	100.0 (8)	32
Total	23.1	46.2	30.7	100.0 (39)	0.0	63.6	36.4	100.0 (11)	50

maximum value and 37.5 percent rated it as having had reasonable value. Overall, 69.3 percent of those respondents who had taken this course placed it in the categories of maximum or reasonable value.

General metals. Table 21 indicates that 49 of the respondents had taken this course. Of those respondents who had taken this course and were employed in education, 60.0 percent rated it at the maximum value level, while the remaining 40.0 percent rated it as having had reasonable value. Of those respondents employed outside of education who had taken this course, 51.7 percent rated it at a level of maximum value and 41.4 percent rated it as having had reasonable value. Overall, 95.9 percent of those respondents who had taken the course rated it as having had maximum or reasonable value.

General woodworking. Table 22 shows that there were 51 respondents who had taken this course. The data indicates that, of those employed in education who had taken this course, 85.0 percent rated it as having had maximum value and the remaining 15.0 percent rated it as having had reasonable value. Of those respondents employed outside of education who had taken the course, 48.4 percent indicated that it had been of maximum value and 41.9 percent rated it as having had reasonable value. Overall, 94.1 percent of those respondents who had taken this course recognized it by placing it in the maximum or reasonable value categories.

Table 21. Rating of General Metals By Respondents Employed In Education and By Those Employed Outside of Education.

Area of Employment	Course Taken				Course Not Taken				Number of Responses
	Maximum Value	Reasonable Value	Minimum Value	Total (N)	Conflict in Schedule	Saw No Need	Felt Need Since Graduation	Total (N)	
	----- Percent -----				-----				
In Education	60.0	40.0	0.0	100.0 (20)	0.0	0.0	100.0	100.0 (1)	21
Outside of Education	51.7	41.4	6.9	100.0 (29)	0.0	80.0	20.0	100.0 (5)	34
Total	55.1	40.8	4.1	100.0 (49)	0.0	66.7	33.3	100.0 (6)	55

Table 22. Rating of General Woodworking By Respondents Employed In Education and By Those Employed Outside of Education.

Area of Employment	Course Taken				Course Not Taken				Number of Responses
	Maximum Value	Reasonable Value	Minimum Value	Total (N)	Conflict in Schedule	Saw No Need	Felt Need Since Graduation	Total (N)	
	----- Percent -----				-----				
In Education	85.0	15.0	0.0	100.0 (20)	0.0	0.0	0.0	0.0 (0)	20
Outside of Education	48.4	41.9	9.7	100.0 (31)	0.0	66.7	33.3	100.0 (3)	34
Total	62.7	31.4	5.9	100.0 (51)	0.0	66.7	33.3	100.0 (3)	54

Power mechanics. Table 23 indicates that there were 38 respondents who had taken this course. Of those employed in education who had taken this course, 40.0 percent rated it at the maximum value level and 40.0 percent rated it of reasonable value. Of those respondents employed outside of education who took the course, 34.8 percent indicated that it had been of maximum value and 52.5 percent identified it at a level of reasonable value. Overall, 84.2 percent of those respondents who had taken the course recognized it by placing it in the categories of maximum or reasonable value.

Architectural graphics. The data in Table 24 shows that there were 41 respondents who had taken this course. Of those employed in education who had taken the course, 58.8 percent rated it as having had maximum value and 35.3 percent rated it at a level of reasonable value. Of those respondents who were employed outside of education who took the course, 75.0 percent rated it at the maximum value level and 8.3 percent rated it of reasonable value. Overall, 87.8 percent of those who had taken the course rated it as having had maximum or reasonable value.

Fundamentals of applied electronics. There were 33 respondents who had taken this course (Table 25). Of those employed in education who had taken the course, none perceived it as having maximum value and 58.3 percent perceived it as having reasonable value. Of those employed outside of education who took the course, 14.3 percent indicated that it had been of maximum value and 28.6 percent rated it as having had reasonable value. Overall, 48.3

Table 23. Rating of Power Mechanics By Respondents Employed In Education and By Those Employed Outside of Education.

Area of Employment	Course Taken				Course Not Taken				Number of Responses
	Maximum Value	Reasonable Value	Minimum Value	Total (N)	Conflict in Schedule	Saw No Need	Felt Need Since Graduation	Total (N)	
	----- Percent -----				-----				
In Education	40.0	40.0	20.0	100.0 (15)	16.7	33.3	50.0	100.0 (6)	21
Outside of Education	34.8	52.2	13.0	100.0 (23)	0.0	100.0	0.0	100.0 (7)	30
Total	36.8	47.4	7.9	100.0 (38)	7.7	69.2	23.1	100.0 (13)	51

Table 24. Rating of Architectural Graphics By Respondents Employed In Education and By Those Employed Outside of Education.

Area of Employment	Course Taken				Course Not Taken				Number of Responses
	Maximum Value	Reasonable Value	Minimum Value	Total (N)	Conflict in Schedule	Saw No Need	Felt Need Since Graduation	Total (N)	
	----- Percent -----				-----				
In Education	58.8	35.3	5.9	100.0 (17)	50.0	0.0	50.0	100.0 (2)	19
Outside of Education	75.0	8.3	4.2	100.0 (24)	0.0	100.0	0.0	100.0 (6)	30
Total	68.3	19.5	12.2	100.0 (41)	12.5	75.0	12.5	100.0 (8)	49

Table 25. Rating of Fundamentals of Applied Electronics By Respondents Employed In Education and By Those Employed Outside of Education.

Area of Employment	Course Taken				Course Not Taken				Number of Responses
	Maximum Value	Reasonable Value	Minimum Value	Total (N)	Conflict in Schedule	Saw No Need	Felt Need Since Graduation	Total (N)	
	----- Percent -----				-----				
In Education	0.0	58.3	41.7	100.0 (12)	50.0	16.7	33.3	100.0 (6)	18
Outside of Education	14.3	28.6	57.1	100.0 (21)	20.0	80.0	0.0	100.0 (10)	31
Total	9.0	39.3	51.5	100.0 (33)	31.3	56.2	12.5	100.0 (16)	49

percent of the respondents who had taken the course placed it in the categories of maximum or reasonable value.

Machine tool processes. There were 42 respondents who had taken this course (Table 26). Of those respondents employed in education who had taken this course, 58.8 percent rated it at the maximum value level and 29.4 percent rated it as having had reasonable value. Of those respondents who were employed outside of education who had taken the course, 52.0 percent indicated that it had been of maximum value and 36.0 percent identified it at a level of reasonable value. Overall, 88.1 percent of those respondents who had taken the course recognized it by placing it in the maximum or reasonable value categories.

General plastics. The data in Table 27 indicates that there were 33 respondents who had taken this course. Of those respondents employed in education who took the course, 27.3 percent rated it as having had maximum value and 63.6 percent rated it of reasonable value. Of those respondents employed outside of education who had taken the course, 40.9 percent rated it at the maximum value level and 27.3 percent indicated that it had been of reasonable value. Overall, 75.8 percent of those respondents who had taken the course recognized it by placing it in the maximum or reasonable value categories.

Furniture and cabinet construction. Table 28 indicates that there were 43 respondents who had taken this course. Of those

Table 26. Rating of Machine Tool Processes By Respondents Employed In Education and By Those Employed Outside of Education.

Area of Employment	Course Taken				Course Not Taken				Number of Responses
	Maximum Value	Reasonable Value	Minimum Value	Total (N)	Conflict in Schedule	Saw No Need	Felt Need Since Graduation	Total (N)	
	----- Percent -----								
In Education	58.8	29.4	11.8	100.0 (17)	50.0	0.0	50.0	100.0 (2)	19
Outside of Education	52.0	36.0	12.0	100.0 (25)	25.0	75.0	0.0	100.0 (8)	33
Total	54.8	33.3	11.9	100.0 (42)	30.0	60.0	10.0	100.0 (10)	52

Table 27. Rating of General Plastics By Respondents Employed In Education and By Those Employed Outside of Education.

Area of Employment	Course Taken				Course Not Taken				Number of Responses
	Maximum Value	Reasonable Value	Minimum Value	Total (N)	Conflict in Schedule	Saw No Need	Felt Need Since Graduation	Total (N)	
	----- Percent -----				-----				
In Education	27.3	63.6	9.1	100.0 (11)	28.6	14.3	57.1	100.0 (7)	18
Outside of Education	40.9	27.3	31.8	100.0 (22)	25.0	62.5	12.5	100.0 (8)	30
Total	36.4	39.4	24.2	100.0 (33)	26.7	40.0	33.3	100.0 (15)	48

Table 28. Rating of Furniture and Cabinet Construction By Respondents Employed In Education and By Those Employed Outside of Education.

Area of Employment	Course Taken				Course Not Taken				Number of Responses
	Maximum Value	Reasonable Value	Minimum Value	Total (N)	Conflict in Schedule	Saw No Need	Felt Need Since Graduation	Total (N)	
	----- Percent -----				-----				
In Education	75.0	18.7	6.3	100.0 (16)	25.0	0.0	75.0	100.0 (4)	20
Outside of Education	66.7	29.6	3.7	100.0 (27)	0.0	80.0	20.0	100.0 (5)	32
Total	69.8	25.6	4.6	100.0 (43)	11.2	44.4	44.4	100.0 (9)	52

employed in education who had taken the course, 75.0 percent placed it in the category of maximum value and 18.7 percent identified it at a level of reasonable value. Of those respondents employed outside of education and who had taken the course, 66.7 percent rated it as having had maximum value and 29.6 percent placed it in the category of reasonable value. Overall, 95.4 percent of the respondents who had taken the course rated it as having had maximum or reasonable value.

Physical testing technology. There were 15 respondents who had taken this course (Table 29). Of those employed in education who had taken the course, 60.0 percent rated it at the maximum value level and 20.0 percent rated it as having had reasonable value. Of those employed outside of education who had taken the course, 50.0 percent indicated that it had been of maximum value and 30.0 percent identified it at a level of reasonable value. Overall, 80.0 percent of those respondents who had taken the course recognized it by placing it in the categories of maximum or reasonable value.

Welding, brazing, cutting, and related processes. Table 30 indicates that there were 29 respondents who had taken this course. Of those who had taken the course and were employed in education, 66.7 percent rated it as having had maximum value and the remaining 33.3 percent rated it at the reasonable value level. Of those employed outside of education who had taken the course, 64.7 percent placed it in the category of maximum value and 23.5 percent indicated that it had been of reasonable value. Overall, 93.2 percent of the

Table 29. Rating of Physical Testing Technology By Respondents Employed In Education and By Those Employed Outside of Education.

Area of Employment	Course Taken				Course Not Taken				Number of Responses
	Maximum Value	Reasonable Value	Minimum Value	Total (N)	Conflict in Schedule	Saw No Need	Felt Need Since Graduation	Total (N)	
	----- Percent -----				-----				
In Education	60.0	20.0	20.0	100.0 (5)	28.6	71.4	0.0	100.0 (7)	12
Outside of Education	50.0	30.0	20.0	100.0 (10)	33.3	60.0	6.7	100.0 (15)	25
Total	53.3	26.7	20.0	100.0 (15)	31.8	63.6	4.6	100.0 (22)	37

Table 30. Rating of Welding, Brazing, Cutting, and Related Processes By Respondents Employed In Education and By Those Employed Outside of Education.

Area of Employment	Course Taken				Course Not Taken				Number of Responses
	Maximum Value	Reasonable Value	Minimum Value	Total (N)	Conflict in Schedule	Saw No Need	Felt Need Since Graduation	Total (N)	
	----- Percent -----				-----				
In Education	66.7	33.3	0.0	100.0 (12)	16.7	16.7	66.6	100.0 (6)	18
Outside of Education	64.7	23.5	11.8	100.0 (17)	27.3	54.5	18.2	100.0 (11)	28
Total	65.6	27.6	6.8	100.0 (29)	23.5	41.2	35.3	100.0 (17)	46

respondents who had taken the course rated it as having had maximum or reasonable value.

Electronic technology. The data in Table 31 indicates that there were 17 respondents who had taken this course. Of those employed in education who had taken the course, 14.3 percent rated it at a level of maximum value and 57.1 percent rated it as having had reasonable value. Of those respondents employed outside of education who had taken the course, 20.0 percent rated it as having had maximum value and 50.0 percent rated it of reasonable value. Overall, 70.5 percent of those respondents who had taken the course rated it as having had maximum or reasonable value.

History and philosophy of industrial education. There were 50 respondents who had taken this course (Table 32). Of those respondents employed in education who had taken this course, 14.3 percent rated it at the maximum value level and 47.6 percent placed it at a level of reasonable value. Of those employed outside of education who had taken the course, 20.7 percent indicated that it had been of maximum value and 44.8 percent rated it as having had reasonable value. Overall, 64.0 percent of those respondents who had taken the course recognized it by placing it in the maximum or reasonable value categories.

Shop organization and management. The data in Table 33 indicates that there were 54 respondents who had taken this course. Of those employed in education who had taken the course, 47.6 percent rated it as having had maximum value and 38.1 percent rated it as

Table 31. Rating of Electronic Technology By Respondents Employed In Education and By Those Employed Outside of Education.

Area of Employment	Course Taken				Course Not Taken				Number of Responses
	Maximum Value	Reasonable Value	Minimum Value	Total (N)	Conflict in Schedule	Saw No Need	Felt Need Since Graduation	Total (N)	
	----- Percent -----				-----				
In Education	14.3	57.1	28.6	100.0 (7)	33.3	66.7	0.0	100.0 (6)	13
Outside of Education	20.0	50.0	30.0	100.0 (10)	30.0	70.0	0.0	100.0 (10)	20
Total	17.6	52.9	29.4	100.0 (17)	31.3	68.7	0.0	100.0 (16)	33

Table 32. Rating of History and Philosophy of Industrial Education By Respondents Employed In Education and By Those Employed Outside of Education.

Area of Employment	Course Taken				Course Not Taken				Number of Responses
	Maximum Value	Reasonable Value	Minimum Value	Total (N)	Conflict in Schedule	Saw No Need	Felt Need Since Graduation	Total (N)	
	----- Percent -----				-----				
In Education	14.3	47.6	38.1	100.0 (21)	0.0	0.0	0.0	0.0 (0)	21
Outside of Education	20.7	44.8	34.5	100.0 (29)	100.0	0.0	0.0	100.0 (3)	32
Total	18.0	46.0	36.0	100.0 (50)	100.0	0.0	0.0	100.0 (3)	53

Table 33. Rating of Shop Organization and Management By Respondents Employed In Education and By Those Employed Outside of Education.

Area of Employment	Course Taken				Course Not Taken				Number of Responses
	Maximum Value	Reasonable Value	Minimum Value	Total (N)	Conflict in Schedule	Saw No Need	Felt Need Since Graduation	Total (N)	
	----- Percent -----				-----				
In Education	47.6	38.1	14.3	100.0 (21)	100.0	0.0	0.0	100.0 (1)	22
Outside of Education	45.4	39.4	15.2	100.0 (33)	100.0	0.0	0.0	100.0 (1)	34
Total	46.3	38.9	14.8	100.0 (54)	100.0	0.0	0.0	100.0 (2)	56

having had reasonable value. Of those employed outside of education who had taken the course, 45.4 percent placed it at the maximum value level and 39.4 percent identified it at a level of reasonable value. Overall, 85.2 percent of those respondents who had taken the course rated it in the categories of maximum or reasonable value.

Materials and methods for teaching shop and related subjects.

Table 34 indicates that there were 48 respondents who had taken this course. Of those employed in education who had taken the course, 57.9 percent rated it as having had maximum value and the remaining 42.1 percent rated it as having had reasonable value. Of those respondents employed outside of education who had taken the course, 51.7 percent rated it as having had maximum value and 27.6 percent rated it as having had reasonable value. Overall, 87.5 percent of the respondents who had taken the course recognized it by placing it in the maximum or reasonable value categories.

School shop safety. There were 49 respondents who had taken this course (Table 35). Of those employed in education who had taken this course, 75.0 percent rated it at the maximum value level, while the remaining 25.0 percent rated it as having had reasonable value. Of those respondents employed outside of education who had taken the course, 65.5 percent indicated that it had been of maximum value and 31.0 percent rated it as having been of reasonable value. Overall, 98.0 percent of those respondents who had taken the course recognized it by placing it in the maximum or reasonable value categories.

Table 34. Rating of Materials and Methods for Teaching Shop and Related Subjects By Respondents Employed In Education and By Those Employed Outside of Education.

Area of Employment	Course Taken				Course Not Taken				Number of Responses
	Maximum Value	Reasonable Value	Minimum Value	Total (N)	Conflict in Schedule	Saw No Need	Felt Need Since Graduation	Total (N)	
	----- Percent -----				-----				
In Education	57.9	42.1	0.0	100.0 (19)	0.0	0.0	0.0	100.0 (0)	19
Outside of Education	51.7	27.6	20.7	100.0 (29)	66.7	0.0	33.3	100.0 (3)	32
Total	54.2	33.3	12.5	100.0 (48)	66.7	0.0	33.3	100.0 (3)	51

Table 35. Rating of School Shop Safety By Respondents Employed In Education and By Those Employed Outside of Education.

Area of Employment	Course Taken				Course Not Taken				Number of Responses
	Maximum Value	Reasonable Value	Minimum Value	Total (N)	Conflict in Schedule	Saw No Need	Felt Need Since Graduation	Total (N)	
	----- Percent -----				-----				
In Education	75.0	25.0	0.0	100.0 (20)	0.0	0.0	100.0	100.0 (1)	21
Outside of Education	65.5	31.0	3.5	100.0 (29)	33.4	33.3	33.3	100.0 (3)	32
Total	69.4	28.6	2.0	100.0 (49)	25.0	25.0	50.0	100.0 (4)	53

Automotive mechanics. Table 36 indicates that there were 15 respondents who had taken this course. Of those respondents employed in education who had taken the course, none rated it as having maximum value, while 57.1 percent rated it at a level of reasonable value. Of those respondents employed outside of education who had taken the course, 12.5 percent indicated that it had been of maximum value and 62.5 percent identified it at a level of reasonable value. Overall, 66.7 percent of those respondents who had taken the course rated it in the categories of maximum or reasonable value.

Industrial graphics. The data in Table 37 indicates that 39 respondents had taken this course. Of those employed in education who had taken the course, 60.0 percent rated it as having had maximum value and 26.7 percent placed it at the reasonable value level. Of those employed outside of education who had taken the course, 58.4 percent placed it at the maximum value level and 33.3 percent rated it as having had reasonable value. Overall, 89.8 percent of those respondents who had taken the course rated it as having had maximum or reasonable value.

Industrial electricity and equipment circuits. Table 38 indicates that there were 20 respondents who had taken this course. Of those employed in education who had taken the course, none perceived it as having maximum value and 66.7 percent perceived it as having reasonable value. Of those employed outside of education who had taken the course, 27.2 percent indicated that it had been of maximum value and 36.4 percent rated it at a level of reasonable

Table 36. Rating of Automotive Mechanics By Respondents Employed In Education and By Those Employed Outside of Education.

Area of Employment	Course Taken				Course Not Taken				Number of Responses
	Maximum Value	Reasonable Value	Minimum Value	Total (N)	Conflict in Schedule	Saw No Need	Felt Need Since Graduation	Total (N)	
	----- Percent -----				-----				
In Education	0.0	57.1	42.9	100.0 (7)	28.6	42.8	28.6	100.0 (7)	14
Outside of Education	12.5	62.5	25.0	100.0 (8)	33.3	61.1	5.6	100.0 (18)	26
Total	6.7	60.0	33.3	100.0 (15)	32.0	56.0	12.0	100.0 (25)	40

Table 37. Rating of Industrial Graphics By Respondents Employed In Education and By Those Employed Outside of Education.

Area of Employment	Course Taken				Course Not Taken			Number of Responses
	Maximum Value	Reasonable Value	Minimum Value	Total (N)	Conflict in Schedule	Saw No Need	Felt Need Since Graduation	
	----- Percent -----							
In Education	60.0	26.7	13.3	100.0 (15)	25.0	0.0	75.0	100.0 (4) 19
Outside of Education	58.4	33.3	8.3	100.0 (24)	28.6	71.4	0.0	100.0 (7) 31
Total	59.0	30.8	10.2	100.0 (39)	27.3	45.5	25.2	100.0 (11) 50

Table 38. Rating of Industrial Electricity and Equipment Circuits By Respondents Employed In Education and By Those Employed Outside of Education.

Area of Employment	Course Taken				Course Not Taken				Number of Responses
	Maximum Value	Reasonable Value	Minimum Value	Total (N)	Conflict in Schedule	Saw No Need	Felt Need Since Graduation	Total (N)	
	----- Percent -----				-----				
In Education	0.0	66.7	33.3	100.0 (9)	50.0	12.5	37.5	100.0 (8)	17
Outside of Education	27.2	36.4	36.4	100.0 (11)	28.6	64.3	7.1	100.0 (14)	25
Total	15.0	50.0	35.0	100.0 (20)	36.4	45.5	18.1	100.0 (22)	42

value. Overall, 65.0 percent of those respondents who had taken the course placed it in the categories of maximum or reasonable value.

Advanced general metals. There were 32 respondents who had taken this course (Table 39). Of those employed in education who had taken the course, 61.5 percent rated it at a level of maximum value, while the remaining 38.5 percent indicated that it had been of reasonable value. Of those employed outside of education who had taken the course, 73.7 percent identified it at a level of maximum value, while the remaining 26.3 percent rated it as having had reasonable value. Overall, 100.0 percent of the respondents who had taken the course placed it in the categories of maximum or reasonable value.

Plastic processing. Table 40 indicates that there were 30 respondents who had taken this course. Of those respondents who were employed in education and had taken the course, 36.4 percent rated it as having had maximum value and 54.5 percent rated it as having had reasonable value. Of those respondents employed outside of education who had taken the course, 52.6 percent indicated that it had been of maximum value and 21.1 percent rated it as having had reasonable value. Overall, 80.0 percent of the respondents who had taken the course rated it in the categories of maximum or reasonable value.

Construction methods and materials. The data in Table 41 indicates that 36 of the respondents had taken this course. Of the

Table 39. Rating of Advanced General Metals By Respondents Employed In Education and By Those Employed Outside of Education.

Area of Employment	Course Taken				Course Not Taken				Number of Responses
	Maximum Value	Reasonable Value	Minimum Value	Total (N)	Conflict in Schedule	Saw No Need	Felt Need Since Graduation	Total (N)	
	----- Percent -----				-----				
In Education	61.5	38.5	0.0	100.0 (13)	20.0	20.0	60.0	100.0 (5)	18
Outside of Education	73.7	26.3	0.0	100.0 (19)	10.0	90.0	0.0	100.0 (10)	29
Total	68.8	31.2	0.0	100.0 (32)	13.3	66.7	20.0	100.0 (15)	47

Table 40. Rating of Plastic Processing By Respondents Employed In Education and By Those Employed Outside of Education.

Area of Employment	Course Taken				Course Not Taken				Number of Responses
	Maximum Value	Reasonable Value	Minimum Value	Total (N)	Conflict in Schedule	Saw No Need	Felt Need Since Graduation	Total (N)	
	----- Percent -----				-----				
In Education	36.4	54.5	9.1	100.0 (11)	33.3	16.7	50.0	100.0 (6)	17
Outside of Education	52.6	21.1	26.3	100.0 (19)	18.2	81.8	0.0	100.0 (11)	30
Total	46.7	33.3	20.0	100.0 (30)	23.6	58.8	17.6	100.0 (17)	47

Table 41. Rating of Construction Methods and Materials By Respondents Employed In Education and By Those Employed Outside of Education.

Area of Employment	Course Taken				Course Not Taken				Number of Responses
	Maximum Value	Reasonable Value	Minimum Value	Total (N)	Conflict in Schedule	Saw No Need	Felt Need Since Graduation	Total (N)	
	----- Percent -----				-----				
In Education	50.0	41.7	8.3	100.0 (12)	57.1	14.3	28.6	100.0 (7)	19
Outside of Education	58.3	37.5	4.2	100.0 (24)	16.7	83.3	0.0	100.0 (6)	30
Total	55.5	38.9	5.6	100.0 (36)	38.5	46.2	15.3	100.0 (13)	49

respondents employed in education who had taken the course, 50.0 percent determined it as having been of maximum value and 41.7 percent rated it at a level of reasonable value. Of those employed outside of education who had taken the course, 58.3 percent indicated that it had been of maximum value and 37.5 percent placed it in the category of reasonable value. Overall, 94.4 percent of those respondents who had taken the course rated it in the categories of maximum or reasonable value.

Graphic arts reproduction processes. There were 30 respondents who had taken this course (Table 42). Of those respondents employed in education who had taken the course, 50.0 percent rated it as having had maximum value and 30.0 percent identified it as having had reasonable value. Of those employed outside of education who had taken the course, 50.0 percent identified it at a level of maximum value and 40.0 percent rated it as having had reasonable value. Overall, 86.7 percent of those respondents who had taken the course rated it as having had maximum or reasonable value.

Methods of teaching shop and related subjects. Table 43 indicates that there were 46 respondents who had taken this course. Of those employed in education who had taken the course, 64.3 percent determined it as having been of maximum value and 21.4 percent rated it as having had reasonable value. Of those employed outside of education who had taken the course, 59.4 percent rated it at a level of maximum value and 28.1 percent identified it at a level of reasonable value. Overall, 87.0 percent of those respondents

Table 42. Rating of Graphic Arts Reproduction Processes By Respondents Employed In Education and By Those Employed Outside of Education.

Area of Employment	Course Taken				Course Not Taken				Number of Responses
	Maximum Value	Reasonable Value	Minimum Value	Total (N)	Conflict in Schedule	Saw No Need	Felt Need Since Graduation	Total (N)	
	----- Percent -----				-----				
In Education	50.0	30.0	20.0	100.0 (10)	33.3	33.3	33.4	100.0 (6)	16
Outside of Education	50.0	40.0	10.0	100.0 (20)	42.8	42.8	14.4	100.0 (7)	27
Total	50.0	36.7	13.3	100.0 (30)	38.5	38.5	23.0	100.0 (13)	43

Table 43. Rating of Methods of Teaching Shop and Related Subjects By Respondents Employed In Education and By Those Employed Outside of Education.

Area of Employment	Course Taken				Course Not Taken				Number of Responses
	Maximum Value	Reasonable Value	Minimum Value	Total (N)	Conflict in Schedule	Saw No Need	Felt Need Since Graduation	Total (N)	
	----- Percent -----				-----				
In Education	64.3	21.4	14.3	100.0 (14)	50.0	50.0	0.0	100.0 (2)	16
Outside of Education	59.4	28.1	12.5	100.0 (32)	0.0	0.0	0.0	0.0 (0)	32
Total	60.9	26.1	13.0	100.0 (46)	50.0	50.0	0.0	100.0 (2)	48

who had taken the course recognized it by placing it in the maximum or reasonable value categories.

Laboratory equipment maintenance. There were 37 respondents who had taken this course (Table 44). Of those respondents employed in education who had taken the course, 77.8 percent rated it at the maximum value level and 11.1 percent rated it as having had reasonable value. Of those employed outside of education who had taken the course, 60.7 percent identified it as having had maximum value and 28.6 percent placed it at the reasonable value level. Overall, 89.2 percent of those respondents who had taken the course determined it as having been of maximum or reasonable value.

Curriculum building in trade and industrial subjects. The data in Table 45 indicates that 36 respondents had taken this course. Of those employed in education who had taken the course, 37.5 percent rated it as having had maximum value and 43.7 percent indicated that it had been of reasonable value. Of those employed outside of education who had taken the course, 30.0 percent rated it as having had maximum value and 50.0 percent placed it at the level of reasonable value. Overall, 80.6 percent of those respondents who had taken the course placed it in the categories of maximum or reasonable value.

Directed teaching. Table 46 indicates that there were 45 respondents who had taken this course. Of those respondents

Table 44. Rating of Laboratory Equipment Maintenance By Respondents Employed In Education and By Those Employed Outside of Education.

Area of Employment	Course Taken				Course Not Taken				Number of Responses
	Maximum Value	Reasonable Value	Minimum Value	Total (N)	Conflict in Schedule	Saw No Need	Felt Need Since Graduation	Total (N)	
	----- Percent -----				-----				
In Education	77.8	11.1	11.1	100.0 (9)	57.1	0.0	42.9	100.0 (7)	16
Outside of Education	60.7	28.6	10.7	100.0 (28)	0.0	85.7	14.3	100.0 (7)	35
Total	64.9	24.3	10.8	100.0 (37)	28.6	42.9	28.5	100.0 (14)	51

Table 45. Rating of Curriculum Building in Trade and Industrial Subjects By Respondents Employed In Education and By Those Employed Outside of Education.

Area of Employment	Course Taken				Course Not Taken				Number of Responses
	Maximum Value	Reasonable Value	Minimum Value	Total (N)	Conflict in Schedule	Saw No Need	Felt Need Since Graduation	Total (N)	
	----- Percent -----				-----				
In Education	37.5	43.7	18.8	100.0 (16)	66.7	33.3	0.0	100.0 (3)	19
Outside of Education	30.0	50.0	20.0	100.0 (20)	40.0	50.0	10.0	100.0 (10)	30
Total	33.3	47.3	19.4	100.0 (36)	46.2	46.2	7.6	100.0 (13)	49

Table 46. Rating of Directed Teaching By Respondents Employed In Education and By Those Employed Outside of Education.

Area of Employment	Course Taken				Course Not Taken				Number of Responses
	Maximum Value	Reasonable Value	Minimum Value	Total (N)	Conflict in Schedule	Saw No Need	Felt Need Since Graduation	Total (N)	
	----- Percent -----				-----				
In Education	58.8	23.5	17.7	100.0 (17)	0.0	0.0	0.0	0.0 (0)	17
Outside of Education	57.2	32.1	10.7	100.0 (28)	0.0	100.0	0.0	100.0 (2)	30
Total	57.8	28.9	13.3	100.0 (45)	0.0	100.0	0.0	100.0 (2)	47

employed in education who had taken the course, 58.8 percent rated it at the maximum value level and 23.5 percent rated it as having had reasonable value. Of those employed outside of education who had taken the course, 57.2 percent indicated that it had been of maximum value and 32.1 percent placed it at the reasonable value level. Overall, 86.7 percent of those respondents who had taken the course rated it as having had maximum or reasonable value.

Special topics in drafting. There were 19 respondents who had taken this course (Table 47). Of those respondents employed in education who had taken the course, 42.8 percent rated it at a level of maximum value and 28.6 percent rated it as having had reasonable value. Of those employed outside of education who had taken the course, 33.3 percent rated it at the maximum value level and 50.0 percent identified it at a level of reasonable value. Overall, 78.9 percent of those respondents who had taken the course placed it in the categories of maximum or reasonable value.

Construction processes. The data in Table 48 indicates that 30 respondents had taken this course. Of those who had taken the course and were employed in education, 33.3 percent rated it at the maximum value level and 44.5 percent indicated that it had been of reasonable value. Of those employed outside of education who had taken the course, 76.2 percent rated it as having had maximum value and 19.0 percent identified it at a level of reasonable value. Overall, 90.0 percent of those respondents who had taken the course

Table 47. Rating of Special Topics in Drafting By Respondents Employed In Education and By Those Employed Outside of Education.

Area of Employment	Course Taken				Course Not Taken				Number of Responses
	Maximum Value	Reasonable Value	Minimum Value	Total (N)	Conflict in Schedule	Saw No Need	Felt Need Since Graduation	Total (N)	
	----- Percent -----				-----				
In Education	42.8	28.6	28.6	100.0 (7)	44.5	33.3	22.2	100.0 (9)	16
Outside of Education	33.3	50.0	16.7	100.0 (12)	40.0	40.0	20.0	100.0 (15)	27
Total	36.8	42.1	21.1	100.0 (19)	41.7	37.5	20.8	100.0 (24)	43

Table 48. Rating of Construction Processes By Respondents Employed In Education and By Those Employed Outside of Education.

Area of Employment	Course Taken				Course Not Taken				Number of Responses
	Maximum Value	Reasonable Value	Minimum Value	Total (N)	Conflict in Schedule	Saw No Need	Felt Need Since Graduation	Total (N)	
	----- Percent -----				-----				
In Education	33.3	44.5	22.2	100.0 (9)	50.0	12.5	37.5	100.0 (8)	17
Outside of Education	76.2	19.0	4.8	100.0 (21)	0.0	71.4	28.6	100.0 (7)	28
Total	63.3	26.7	10.0	100.0 (30)	26.7	40.0	33.3	100.0 (15)	45

recognized it by placing it in the maximum or reasonable value categories.

Manufacturing processes. The data in Table 49 indicates that 31 of the respondents had taken this course. Of those employed in education who had taken the course, 41.7 percent rated it as having had maximum value and 50.0 percent rated it at the reasonable value level. Of those employed outside of education who had taken the course, 73.7 percent indicated that it had been of maximum value and 21.0 percent rated it as having had reasonable value. Overall, 93.5 percent of those respondents who had taken the course placed it in the maximum or reasonable value categories.

Materials and processes. There were 23 respondents who had taken this course (Table 50). Of those employed in education who had taken the course, 33.3 percent rated it at the maximum value level and 55.6 percent identified it at a level of reasonable value. Of those employed outside of education who had taken the course, 57.1 percent rated it as having had maximum value, while the remaining 42.9 percent identified it at the reasonable value level. Overall, 95.6 percent of those respondents who had taken the course determined it as having been of maximum or reasonable value.

Power and energy. Table 51 indicates that there were 27 respondents who had taken this course. Of those employed in education who had taken the course, 36.4 percent indicated that it had been of maximum value and 54.5 percent identified it at a level of

Table 49. Rating of Manufacturing Processes By Respondents Employed In Education and By Those Employed Outside of Education.

Area of Employment	Course Taken				Course Not Taken				Number of Responses
	Maximum Value	Reasonable Value	Minimum Value	Total (N)	Conflict in Schedule	Saw No Need	Felt Need Since Graduation	Total (N)	
	----- Percent -----				-----				
In Education	41.7	50.0	8.3	100.0 (12)	28.6	28.6	42.8	100.0 (7)	19
Outside of Education	73.7	21.0	5.3	100.0 (19)	12.5	75.0	12.5	100.0 (8)	27
Total	61.3	32.2	6.5	100.0 (31)	20.0	53.3	26.7	100.0 (15)	46

Table 50. Rating of Materials and Processes By Respondents Employed In Education and By Those Employed Outside of Education.

Area of Employment	Course Taken				Course Not Taken				Number of Responses
	Maximum Value	Reasonable Value	Minimum Value	Total (N)	Conflict in Schedule	Saw No Need	Felt Need Since	Total (N)	
							Graduation		
	----- Percent -----				-----				
In Education	33.3	55.6	11.1	100.0 (9)	33.3	50.0	16.7	100.0 (6)	15
Outside of Education	57.1	42.9	0.0	100.0 (14)	25.0	58.3	16.7	100.0 (12)	26
Total	47.8	47.8	4.4	100.0 (23)	27.8	55.5	16.7	100.0 (18)	41

Table 51. Rating of Power and Energy By Respondents Employed In Education and By Those Employed Outside of Education.

Area of Employment	Course Taken				Course Not Taken				Number of Responses
	Maximum Value	Reasonable Value	Minimum Value	Total (N)	Conflict in Schedule	Saw No Need	Felt Need Since Graduation	Total (N)	
	----- Percent -----				-----				
In Education	36.4	54.5	9.1	100.0 (11)	20.0	40.0	40.0	100.0 (5)	16
Outside of Education	37.5	37.5	25.0	100.0 (16)	9.1	54.5	36.4	100.0 (11)	27
Total	37.0	44.5	18.5	100.0 (27)	12.5	50.0	37.5	100.0 (16)	43

reasonable value. Of those employed outside of education who had taken the course, 37.5 percent rated it as having had maximum value and 37.5 percent placed it at the reasonable value level. Overall, 81.5 percent of the respondents who had taken the course rated it in the categories of maximum or reasonable value.

Course construction in industrial arts. There were 36 respondents who had taken this course (Table 52). Of those employed in education who had taken the course, 60.0 percent rated it at the maximum value level and 26.7 percent placed it at the reasonable value level. Of those employed outside of education who had taken the course, 47.6 percent indicated that it had been of maximum value and 38.1 percent determined it as having been of reasonable value. Overall, 86.1 percent of those respondents who had taken the course rated it as having had maximum or reasonable value.

Evaluation of and Recommendations for the Program

Areas of Preparation

The respondents in this study evaluated the areas of preparation provided through the Industrial Arts curriculum and the various approaches used in classroom situations (Table 53). Eight areas of preparation were evaluated by the respondents as having been considered excellent, adequate, or limited. Overall, 28.0 percent of the respondents rated the areas of preparation as excellent, 44.5 percent rated them as adequate, and 27.5 percent rated them as limited. Of those respondents employed in education, 22.8

Table 52. Rating of Course Construction in Industrial Arts By Respondents Employed In Education and By Those Employed Outside of Education.

Area of Employment	Course Taken				Course Not Taken				Number of Responses
	Maximum Value	Reasonable Value	Minimum Value	Total (N)	Conflict in Schedule	Saw No Need	Felt Need Since Graduation	Total (N)	
	----- Percent -----				-----				
In Education	60.0	26.7	13.3	100.0 (15)	100.0	0.0	0.0	100.0 (1)	16
Outside of Education	47.6	38.1	14.3	100.0 (21)	16.7	33.6	50.0	100.0 (6)	26
Total	52.8	33.3	13.9	100.0 (36)	28.6	28.6	42.8	100.0 (7)	42

Table 53. Evaluation of Areas of Preparation By Respondents Employed In Education and Those Employed Outside of Education.

Areas of Preparation	Employed in Education				Employed Outside of Education				Total			
	Excellent	Adequate	Limited	Total (N)	Excellent	Adequate	Limited	Total (N)	Excellent	Adequate	Limited	Total (N)
A. Engaged in a Variety of Industrial Experiences in Laboratory Classes	23.8	47.6	28.6	100.0 (21)	36.1	30.6	33.3	100.0 (36)	31.6	36.8	31.6	100.0 (57)
B. Developed Skill in the Use of Hand and Machine Tools	28.6	47.6	23.8	100.0 (21)	41.7	33.3	25.0	100.0 (36)	36.8	38.6	24.6	100.0 (57)
C. Studied Industrial Safety Procedures and Practiced Safe Work Habits	38.1	42.8	19.1	100.0 (21)	38.9	44.4	16.7	100.0 (36)	38.6	43.9	17.5	100.0 (57)
D. Received Meaningful General Information Concerning Industrial Processes	23.8	42.8	33.4	100.0 (21)	28.6	51.4	20.0	100.0 (35)	26.8	48.2	25.0	100.0 (56)
E. Received Technical Information as Related to Specific Areas	14.3	52.3	33.4	100.0 (21)	25.0	47.2	27.8	100.0 (36)	21.1	49.1	29.8	100.0 (57)
F. Learned Creativeness in Design and Construction	9.5	33.4	57.1	100.0 (21)	16.7	52.8	30.5	100.0 (36)	14.0	45.6	40.4	100.0 (57)
G. Encouraged to Do Critical Thinking	19.1	47.6	33.3	100.0 (21)	30.5	50.0	19.5	100.0 (36)	26.3	49.1	24.6	100.0 (57)
H. Encouraged to Read and Remain Abreast of Related Literature	26.3	47.4	26.3	100.0 (19)	30.6	44.4	25.0	100.0 (36)	29.1	45.5	25.4	100.0 (55)
I. Other	0	0	100.0	100.0 (1)	0	0	0	0	0	0	100.0	100.0 (1)
Total	22.8	44.9	32.3	100.0 (167)	31.0	44.3	24.7	100.0 (287)	28.0	44.5	27.5	100.0 (454)

percent rated the areas as excellent, 44.9 percent rated them as adequate, and 32.3 percent rated them as limited; whereas, 31.0 percent of those employed outside of education rated these areas as excellent, 44.3 percent as adequate, and 24.7 percent as limited. The two areas of preparation which received the highest "excellent" ratings by the total respondents were industrial safety procedures and safe work habits (38.6 percent) and skill development in the use of hand and machine tools (36.8 percent). The three areas of preparation which received the highest percentage of "adequate" responses were receipt of technical information as related to specific areas, encouragement to do critical thinking (each with 49.1 percent), and receipt of meaningful general information concerning industrial processes (48.2 percent). One area of preparation peaked as having received the largest number of "limited" responses: creativeness in design and construction.

Approaches to Classroom Situations

Nine approaches to classroom situations were rated by the respondents as being either strong or weak points in the Industrial Arts program (Table 54). The approaches which were rated as "strong points" by the highest number of respondents were "individual instruction" (87.8 percent), "laboratory experiences" (75.9 percent), and "individual research" (71.7 percent). The approach rated as "weak point" by the highest number of respondents was "group research" (62.3 percent), followed by "realistic industrial application" (43.3 percent), "industrial orientation" (41.5 percent), and "group projects" (40.0 percent).

Table 54. Approaches to Classroom Situations By Respondents Employed In Education and Those Employed Outside of Education.

Approaches	Employed in Education			Employed Outside of Education			Total		
	Strong Point	Weak Point	Total (N)	Strong Point	Weak Point	Total (N)	Strong Point	Weak Point	Total (N)
	----- percent -----								
Group Projects	60.0	40.0	100.0 (20)	60.0	40.0	100.0 (35)	60.0	40.0	100.0 (55)
Group Research	36.8	63.2	100.0 (19)	38.2	61.8	100.0 (34)	37.7	62.3	100.0 (53)
Individual Instruction	90.5	9.5	100.0 (21)	86.1	13.9	100.0 (36)	87.7	13.2	100.0 (57)
Individual Research	68.4	31.6	100.0 (19)	73.5	26.5	100.0 (34)	71.7	28.3	100.0 (53)
Experimentation	61.1	38.9	100.0 (18)	61.8	38.2	100.0 (34)	61.5	38.5	100.0 (52)
Realistic Industrial Application	52.6	47.4	100.0 (19)	58.8	41.2	100.0 (34)	56.7	43.3	100.0 (53)
Industrial Orientation	63.2	36.8	100.0 (19)	55.9	44.1	100.0 (34)	58.5	41.5	100.0 (53)
Laboratory Experiences	84.2	15.8	100.0 (19)	71.4	28.6	100.0 (35)	75.9	24.1	100.0 (54)
Technically Related Information	61.1	38.9	100.0 (18)	64.7	35.3	100.0 (34)	63.5	36.5	100.0 (52)
Other	0.0	100.0	100.0 (1)	0.0	100.0	100.0 (1)	0.0	100.0	100.0 (2)
Total	64.2	35.8	100.0 (173)	63.3	36.7	100.0 (311)	63.6	36.4	100.0 (484)

Recommendations by Subject Area

Specific recommendations by the respondents concerning the extent of preparation by specific subject areas offered in the program are presented in Table 55. The subject area in which the highest number of respondents recommended more preparation was technology (74.1 percent). Only 1.7 percent of the respondents recommended less preparation and 24.1 percent recommended no change in this area. The subject area in which the second highest number of respondents recommended more preparation was mathematics (71.9 percent). It is interesting to note that no respondents recommended less preparation in this area. No change was recommended by 28.1 percent of the respondents. Business Administration was considered by 57.2 percent of all the respondents as being an area for which they felt more needed preparation. Less preparation was recommended by 8.9 percent of the respondents, while no change was recommended by 33.9 percent. The subject area in which the fourth highest number of respondents recommended more preparation was physics. Of the respondents, 57.1 percent recommended more preparation, while only 5.4 percent recommended less preparation. No change was recommended by 37.5 percent. Of the respondents, 47.4 percent recommended more preparation in technical and/or report writing, with 12.3 percent suggesting less preparation. No change was recommended by 40.3 percent of the participants. Similarly, 47.2 percent of the respondents recommended more preparation in the area of professional education. Less preparation was recommended by 15.7 percent and no change was suggested by 37.7 percent. Economics was considered

Table 55. Extent of Preparation Recommended By Subject Areas By Respondents Employed In Education and Those Employed Outside of Education.

Subject Areas	Employed in Education				Employed Outside of Education				Total			
	More	Less	No Change	Total (N)	More	Less	No Change	Total (N)	More	Less	No Change	Total (N)
Mathematics	63.6	0.0	36.4	100.0 (22)	77.1	0.0	22.9	100.0 (35)	71.9	0.0	28.1	100.0 (57)
Physics	45.4	13.6	40.9	100.0 (22)	64.7	0.0	35.3	100.0 (34)	57.1	5.4	37.5	100.0 (56)
Physical Science	27.3	18.2	54.5	100.0 (22)	33.3	6.1	60.6	100.0 (33)	29.8	14.0	56.2	100.0 (57)
Chemistry	22.7	18.2	59.1	100.0 (22)	26.5	8.8	64.7	100.0 (34)	25.0	12.5	62.5	100.0 (56)
Economics	27.3	18.2	54.5	100.0 (22)	47.1	8.8	44.1	100.0 (34)	39.3	12.5	48.2	100.0 (56)
Business Administration	40.9	13.6	45.5	100.0 (22)	67.6	5.9	26.5	100.0 (34)	57.2	8.9	33.9	100.0 (56)
Professional Education	36.4	27.2	36.4	100.0 (22)	54.8	6.5	38.7	100.0 (31)	47.2	15.1	37.7	100.0 (53)
Technical and/or Report Writing	22.7	22.7	54.6	100.0 (22)	62.9	5.7	31.4	100.0 (35)	47.4	12.3	40.3	100.0 (57)
Technology	68.2	4.5	27.3	100.0 (22)	77.8	0.0	22.2	100.0 (36)	74.1	1.7	24.1	100.0 (56)
Other	100.0	0.0	0.0	100.0 (6)	100.0	0.0	0.0	100.0 (3)	100.0	0.0	0.0	100.0 (9)
Total	41.2	14.7	44.1	100.0 (204)	57.6	4.5	37.9	100.0 (309)	50.9	8.9	40.2	100.0 (515)

by 39.3 percent of the respondents as an area in which they felt more needed preparation, less preparation was recommended by 12.5 percent, while no change was suggested by 48.2 percent. Of all the respondents, only 29.8 percent recommended additional preparation in physical science, with 14.0 percent suggesting less preparation. No change in physical science was recommended by 56.2 percent of the respondents. The subject area in which the lowest number of respondents suggested more preparation was in chemistry (25.0 percent). Less preparation was recommended by 12.5 percent and no change was suggested by 62.5 percent.

When comparing those respondents employed in education to those outside of education, it is interesting that in all nine subject areas, a greater percentage of those respondents outside of education recommended more preparation than did those respondents employed in education, with the greatest discrepancy being found in the areas of technical and/or report writing and business administration, respectively. Conversely, in eight of the nine subject areas, a greater percentage of those respondents employed in education recommended less preparation than did those respondents employed outside of education. The greatest discrepancy was found in the area of professional education.

Advantages of a Career in Industrial Arts

To determine the advantages of a career in industrial arts, the respondents were asked to rank five only, from a list of eight, of what they considered to be the advantages of a career in

industrial arts (Table 56). Each response was weighted, using the following scheme:

Response	Assigned Weight
Rank 1	1
Rank 2	2
Rank 3	3
Rank 4	4
Rank 5	5

Those items not ranked were assigned a value of 7.5. The rank frequency of each career advantage multiplied by its assigned weight divided by the number of responses produced a mean rank value for each advantage. The lower the mean value the higher the advantage was ranked.

The career advantage that received the highest ranking by all the respondents was: "Provides versatile experiences which enables individuals to pursue work in either education or industry" (mean value = 2.28). This advantage was ranked number one by both those respondents employed in education (mean value = 2.31) and those employed outside of education (mean value = 2.27).

The advantage of career choice ranked as number two by all the respondents was: "Provides an opportunity to work closely and directly with people" (mean value = 2.82). The advantage of working with people was also ranked as number two by those respondents employed outside of education (mean value = 2.75). Those

Table 56. Advantages of a Career in Industrial Arts By Respondents Employed In Education and Those Employed Outside of Education.

Advantages	Employed in Education						Employed Outside of Education						Total					
	Frequency					Mean Value	Frequency					Mean Value	Frequency					Mean Value
	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5		Rank 1	Rank 2	Rank 3	Rank 4	Rank 5		Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	
A. Provides an Opportunity to Work with Individuals with Similar Interests	1	0	4	2	5	5.08	4	2	5	4	6	3.29	5	2	9	6	11	3.48
B. Provides an Opportunity to Work Closely and Directly with People	3	2	0	2	3	5.25	5	7	3	7	2	2.75	8	9	3	9	5	2.82
C. Provides a High Degree of Security	1	2	0	2	0	14.60	2	1	0	1	2	6.75	3	3	0	3	2	4.86
D. Provides Content Based on Human Needs, e.g. Exploration and Creativity	2	4	4	2	1	2.69	2	5	7	4	4	3.14	4	9	11	6	5	2.97
E. Provides an Excellent Salary	0	0	0	0	1	8.00	0	0	2	1	5	7.19	0	0	2	1	6	6.94
F. Provides an Opportunity to Be Involved with Problem Solving Experiences	1	6	1	4	1	2.85	1	7	9	3	2	2.91	2	13	10	7	3	2.89
G. Provides Experiences that are Vital, Concrete, Intriguing, and Challenging	0	1	4	1	3	4.50	1	2	3	6	7	3.84	1	3	7	7	10	3.79
H. Provides Versatile Experiences which Enables Individuals to Pursue Work in Either Education or Industry	6	1	3	2	1	2.31	13	5	1	2	5	2.27	19	6	4	4	6	2.28

respondents employed in education ranked as number two: "Provides content based on human needs" (mean value = 2.69).

The career characteristic ranked third by all the respondents was: "Provides an opportunity to be involved with problem solving experiences" (mean value = 2.89). This career advantage was also ranked number three by both those respondents employed in education (mean value = 2.85) and those employed outside of education (mean value = 2.91).

The fourth advantage of a career in industrial arts as selected by the participants was: "Provides content based on human needs" (mean value = 2.97). This advantage was also ranked number four by those employed outside of education (mean value = 3.14), whereas those respondents employed in education ranked as number four: "Provides experiences that are vital, concrete, intriguing, and challenging" (mean value = 4.50).

According to these data, the advantage, "Provides an opportunity to work with individuals with similar interests" (mean value = 3.48) was the fifth ranked career advantage by all the respondents. This advantage was also ranked number five by those employed in education (mean value = 5.08) and those employed outside of education (mean value = 3.29).

Reasons for Changing Occupations

The final area of information obtained from this study identified the respondents' reasons for leaving teaching to secure employment in other occupations or for leaving other occupations to

secure employment in teaching (Tables 57 and 58). The most frequently given reasons for leaving teaching to secure other employment were: better salary in other occupations, as reported by 15.5 percent of the respondents; better chance for advancement in other occupations, as indicated by 8.6 percent of the respondents; and less restrictiveness in other occupations, as shown by 5.2 percent of the respondents.

The most frequently given reasons for leaving other occupations to secure employment in teaching include: better preparation for teaching, as indicated by 3.4 percent of the respondents; less restrictiveness than in previous occupation, also indicated by 3.4 percent; and more security than in previous occupation, as reported by 1.7 percent of the respondents.

Table 57. Respondents' Reasons for Leaving Teaching to Secure Employment in Other Occupations.

Reason for Leaving	Respondents	
	Freq.	Percent
Better Salary than Teaching	9	15.5
More Security than Teaching	0	0.0
Inadequate Preparation for Teaching	0	0.0
Better Chance for Advancement than Teaching	5	8.6
Less Restrictive than Teaching	3	5.2
Question Does not Apply	36	62.1
Other	<u>5</u>	<u>8.6</u>
Total	58	100.0

Table 58. Respondents' Reasons for Leaving Other Occupations to Secure Employment in Teaching.

Reason for Leaving	Respondents	
	Freq.	Percent
Better Salary than in Previous Occupation	0	0.0
More Security than in Previous Occupation	1	1.7
Better Preparation than in Previous Occupation	2	3.4
Better Chance for Advancement than in Previous Occupation	0	0.0
Less Restrictiveness than in Previous Occupation	2	3.4
Question Does not Apply	49	84.6
Other	<u>4</u>	<u>6.9</u>
Total	58	100.0

CHAPTER V

SUMMARY OF PROCEDURES, FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

The purpose of this study was to evaluate the perceptions of the 1971-1980 graduates who had majored in Industrial Education with the Industrial Arts Teacher Education option at The University of Tennessee, Knoxville, concerning the effectiveness of the program in meeting their needs after having become employed. Specifically, the study was to answer the following six questions:

1. Where do the graduates live and in what occupations are they employed?
2. How many graduates have changed occupations and why did they do so?
3. What has been the nature and amount of additional training pursued by the graduates and why?
4. What do the graduates perceive to be the advantages of a career in industrial arts?
5. What importance do the graduates place on the courses taught in the Industrial Arts Teacher Education program?
6. What suggestions do the graduates have for the improvement of the Industrial Arts program at The University of Tennessee, Knoxville?

Summary of Procedures

The population for this study consisted of 86 graduates awarded the Bachelor of Science degree in Industrial Education with the Industrial Arts Teacher Education option at The University of Tennessee, Knoxville, between August 1971 and July 1980. Because of population size, a census survey was conducted by utilizing a mailed questionnaire. A total of 61 questionnaires were completed and returned by the graduates. Fifty-eight were judged satisfactory and were utilized in the actual tabulation of data and statistical analysis.

This survey instrument was developed as a result of a thorough review of related literature and included a series of questions under the following headings: (a) Present occupations, (b) Additional educational pursuits, (c) Evaluation of industrial arts courses, and (d) Evaluation of and recommendations for the Industrial Arts program. The questionnaire was organized in its preliminary form and was submitted as a pilot study to a select group of Industrial Education graduate students and Industrial Education faculty members for comments and suggestions. Utilizing this feedback, the questionnaire was then revised and was submitted to the Industrial Arts faculty, the researcher's committee, the Human Subjects Committee, and the Graduate School for final critique and approval.

The questionnaire, accompanied with a cover letter, participatory consent form, and self-addressed stamped envelope was then mailed to each of the 86 graduates. When each completed questionnaire was received from a graduate, the data were coded and computed.

Percentages, frequencies, measures of central tendency, and cross tabulations were used extensively in the analysis of data.

Findings

The findings presented in this chapter were based on the analysis of data obtained in the study as presented in Chapter IV and were organized utilizing the following headings: (a) Geographic location, (b) Present occupations, (c) Additional educational pursuits, (d) Evaluation of industrial arts courses, and (e) Evaluation of and recommendations for the Industrial Arts program.

Geographic Location

The first major finding of this study was the geographic distribution of the respondents. A total of nine states were represented. The vast majority (91.4 percent) of the participants were residing in the southeastern United States with 81.0 percent living in Tennessee at the time this research was conducted.

Present Occupations

An area of particular significance in this study was the nature of present occupations held by the graduates. Of this study population, 37.9 percent were employed in education, while 62.1 percent were employed in areas outside of education. The subject areas most frequently taught by the respondents employed in education who were teaching industrial arts only were woodworking, metalworking, and drafting, respectively.

Of the respondents employed outside of education, 41.7 percent were employed in industry, 33.3 percent in private business, and 25.0 percent in other occupations. Of those respondents employed in industry, the most frequently reported positions were in the areas of supervision and management. Positions in construction/sales and as machinists and technicians comprised the majority of those employed in private business. The remaining respondents in areas outside of education represented a wide variety of occupations, none of which was directly related to industrial arts.

Additional Educational Pursuits

Educational accomplishments and pursuits beyond the baccalaureate degree comprised a third important component of this research. At the time of this study, 34.5 percent of the respondents had received one or more advanced degrees and 27.6 percent were working toward an advanced degree.

Of those 20 respondents who had earned an advanced degree, 80.0 percent had received the Master's degree, 15.0 percent the Education Specialist degree, and 5.0 percent the Doctorate. A comparison of those employed in education with those employed outside of education showed that a higher percentage of those in education had earned one or more advanced degrees.

Sixteen respondents were working toward an advanced degree. Of this number, 75.0 percent were working toward the Master's degree, 6.3 percent the Education Specialist degree, and 18.7

percent the Doctorate. As with those respondents who had earned an advanced degree, a higher percentage of those employed in education were working toward an advanced degree as compared with those employed outside of education.

The University of Tennessee, Knoxville, was selected as the institution for graduate study by the vast majority of both those respondents who had earned an advanced degree and those who were pursuing additional education. Of those seeking advanced degrees, most were studying in areas of industrial education, safety education, and vocational-technical education.

Overall, the reason most frequently given for pursuing additional education was to provide personal satisfaction. This reason was also ranked as number one by those respondents employed outside of education, whereas the reason ranked as number one by those participants employed in education was to qualify for an increment on their salary schedule. The justification ranked last by the majority of those respondents employed in education and those employed outside of education was to overcome inadequacies in previous preparation. Only 20.7 percent of those respondents who had pursued additional education indicated that this education was a requirement of their employer. The majority of those respondents required by their employer to obtain additional education were employed in education.

Evaluation of Industrial Arts Courses

Another prominent aspect of this research relates to the study population's evaluation of the importance placed on specific

course offerings in the Industrial Arts program. The majority of the responding graduates indicated that, overall, courses offered in Industrial Arts Teacher Education were of "reasonable" or "maximum" value. Of all the courses, the following were most frequently evaluated as having "maximum" value by the respondents having taken the particular course. They were, in descending order, Graphic Communications, Furniture and Cabinet Construction, School Shop Safety, and Advanced General Metals; while Fundamentals of Applied Electronics, History and Philosophy of Industrial Education, Industrial Electricity and Equipment Circuits, and Automotive Mechanics were courses most frequently ranked as having "minimum" value by those respondents who had taken the particular courses.

Of those respondents employed in education who had taken the particular courses, the following were ranked, in descending order, as having "maximum" value: Graphic Communications, General Woodworking, Laboratory Equipment Maintenance, Furniture and Cabinet Construction, and School Shop Safety; whereas, Architectural Graphics, Advanced General Metals, Manufacturing Processes, and Graphic Communications were ranked as having "maximum" value by those employed outside of education.

The four courses ranked, in descending order, as having "minimum" value by those employed in education were Automotive Mechanics, Fundamentals of Applied Electronics, History and Philosophy of Industrial Education, and Industrial Electricity and Equipment Circuits. Fundamentals of Applied Electricity,

Industrial Electricity and Equipment Circuits, History and Philosophy of Industrial Education, and Basic and Applied Electricity were ranked similarly by those respondents employed outside of education.

The four courses not taken by the largest number of respondents were Automotive Mechanics, Special Topics in Drafting, Physical Testing Technology, and Industrial Electricity and Equipment Circuits. Of these courses, Special Topics in Drafting was the one in which the largest number of respondents indicated having had a conflict in schedule; whereas, Physical Testing Technology and Automotive Mechanics were those in which a majority saw no need. Those who responded to each course indicated that they had felt the greatest need for the courses, Special Topics in Drafting, and Industrial Electricity and Equipment Circuits since graduation.

Evaluation of and Recommendations for the Program

The fifth major component of this research is the evaluation of and recommendations for the Industrial Arts program. The findings indicated that the majority of the responding graduates felt that their undergraduate work had provided them with excellent or adequate preparation for employment, with no significant differences between those respondents employed in education and those employed outside of education. The one area of preparation, however, that received the largest overall percentage of "limited" responses was creativity in design and construction.

The majority of the respondents indicated that all of the nine approaches to classroom situations were strong points in their

academic preparation, except for group research. The group research approach was evaluated as a weak point by the majority of those respondents employed in education as well as those employed outside of education.

In the evaluation of subject areas within the curriculum, the majority of respondents recommended no change in the areas of chemistry, physical science, and economics, and recommended further preparation in the areas of technology, mathematics, business administration, and physics. Further suggested recommendations included the addition of the following to the Industrial Arts program: computer technology, adolescent psychology, school shop discipline, teacher liability, student teaching during the freshman year, and a nine-month practicum incorporating both teaching and industrial experience.

Another significant finding was that the major advantage of a career in industrial arts, as indicated by the responding graduates, was that it provides versatile experiences which enable individuals to become successfully employed not only in education but also in industry. When respondents left teaching to secure other employment, they tended to do so because of better salary, better chance for advancement, and less restrictiveness than in teaching. On the other hand, those who left other occupations to secure employment in teaching did so because of better preparation for teaching and less restrictiveness and more security than in their previous occupation.

Conclusions

Based on the research findings of this study, the following conclusions were formulated. It was concluded by the researcher that the majority of the Industrial Arts graduates were from Tennessee or surrounding states and, therefore, tend to secure employment in the same geographic area after graduation. A similar conclusion was reached by both Sorenson and Miller, each of whom reported that the majority of the respondents in their studies resided in the same state in which they obtained their undergraduate degree. It is further concluded that, as the majority of the respondents were employed outside of education, the program design was sensitive to area needs and tended to prepare graduates for regional employment, both within and outside of education. This finding parallels that of Lambert, in part, who found that, as 71.9 percent of the graduates in his study were employed in industry, consideration of the curriculum for those in industrial employment is necessary.

Over one-third of the respondents entered teaching following graduation and later left teaching to obtain employment in another field, whereas less than one-sixth entered an occupation other than teaching following graduation and later entered teaching. As a result of this finding, as well as that of Sorenson, it was concluded that once a graduate leaves teaching to seek employment in another field, he/she will be less likely to return to the teaching profession, primarily as a result of higher salaries, as was also

reported by both Sorenson and Gifford, and the feeling of increased opportunities for advancement in non-teaching positions.

The majority of the graduates in this study either were working toward or had earned an advanced degree. Consequently, it was concluded that industrial arts graduates, in general, are motivated to maintain and enhance competencies in education. Similar findings were reported by Patterson, Winters, and Gifford, each of whom found that the majority of the respondents in their studies either were planning to begin, were working toward, or had earned advanced degrees.

The perceived overriding advantage of a career in industrial arts was that it provided versatile experiences that enabled graduates to pursue work choices either in education or industry. Thus, the researcher concluded that the Industrial Arts option provided the students with an opportunity to develop skills which were basic both to education and to other related business and industrial occupations. In a similar question asked by Edwards, it was found that the overriding advantage of a career in industrial arts was that the content is based on human needs, e.g. the need to create, explore, manipulate, excel, and beautify. This advantage was ranked fourth in the present study.

Since the majority of the graduates indicated that, by and large, the courses taught in the Industrial Arts program were of reasonable or maximum value, it was concluded by the researcher that the undergraduate courses were, at the time, adequately preparing individuals for education and industry-related employment. The

findings reported by Lambert, Mott, Sorenson, Miller, Weiner, Winters, and Gifford revealed that the graduates in their studies were also generally satisfied with course offerings and Lambert, Mott, and Weiner further indicated that the curriculum was adequately preparing the graduates to meet the needs of subsequent employment.

In view of the fact that a majority of the respondents did not offer any suggestions for program improvement, it was concluded that the existing program was meeting their basic professional and/or technical needs. From the suggestions that were offered, however, it was further concluded that greater emphasis be placed on pragmatic aspects of their learning experiences. One of these suggestions, a nine-month practicum incorporating both teaching and industrial experience, was closely related to that recommended by Weiner, who reported the need to lengthen the period of directed teaching.

Recommendations

The following recommendations are made as a result of the major findings of this study:

1. The division of Industrial Education at The University of Tennessee, Knoxville, secure and maintain the names and addresses of those graduates who have completed the Industrial Arts Teacher Education option in order to maintain a current profile of its alumni. Presently, there is no formal method within the division of Industrial Education of identifying those graduates

who have majored in the Industrial Arts Teacher Education option. Furthermore, The University of Tennessee, Knoxville, Office of Admissions and Records maintains transcripts of the graduates of the division of Industrial Education without a categorization into each of the division's four options.

2. A study of unsuccessful degree candidates be conducted to identify possible inadequacies in the existing program which may cause potentially good students to leave the program prior to graduation. Looking at specific reasons why students did not complete the program can be useful in locating possible program deficiencies which need to be modified in future program planning.
3. The Industrial Education division investigate innovative methods to recruit students from other states, in addition to Tennessee, in order to (a) extend the boundaries of the Industrial Arts program and (b) increase the number of graduates who will consider employment both within and outside of Tennessee. As was found in the present study, over 80.0 percent of the respondents are remaining in Tennessee after graduation. It would be advantageous for the program to produce professionals who, by being employed in a variety of states, would strengthen the reputation of the program nationally.
4. Future follow-up studies of graduates having the Industrial Arts option be conducted at five-year intervals in

order to assess more consistently and accurately the program's effectiveness. Such evaluations at regular intervals are necessary in order to determine if the preparation the graduates have received is adequate in meeting their practicing needs in subsequent employment, and to determine what changes, if any, have resulted from previous follow-up studies.

5. Areas of program deficiency identified in this study should be considered by faculty and administrators in future program planning. Specific suggestions to be considered include:
 - (a) Expand laboratory courses to provide further training in hands-on-skills development.
 - (b) Provide additional emphasis in the following areas: behavior management, adolescent psychology, school law, classroom management, and computer technology. This suggestion is supported by Sorenson, who reported that the respondents in education in his study felt that students need to learn to handle more appropriately the practical aspects of teaching in a controlled situation.
 - (c) Provide teacher education orientation to the students in Industrial Arts Teacher Education during their freshman year. Relative to this suggestion, both Sorenson and Weiner recommended that students

become involved in the teaching process sooner in their academic preparation.

- (d) Expand the Industrial Arts curriculum to include more preparation in technology, business administration, mathematics, and physics. Graduates in the study conducted by Miller expressed a similar need for additional preparation in varied technical areas and mathematics.
- (e) Evaluate and/or revise the courses entitled Fundamentals of Applied Electronics, History and Philosophy of Industrial Education, and Automotive Mechanics. A similar recommendation was suggested by Edwards for the area of electricity/electronics.

This chapter has provided a summary of procedures utilized in this research and a presentation of the resulting findings, conclusions, and recommendations. The findings are inclusive of the geographic location of the respondents, nature of occupation at the time of the study, additional educational accomplishments and pursuits, an evaluation of the Industrial Arts courses taken in the program, and an evaluation of and recommendations for the program. Conclusions based on these findings are provided, answering the six research questions asked in the study and comparing the results with similar findings of other researchers as described in Chapter II.

Resulting recommendations, including identified areas of program deficiencies, are presented for consideration of the Industrial Arts faculty and administrators in future program planning.

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APPENDIXES

APPENDIX A

AN EVALUATION OF THE INDUSTRIAL ARTS TEACHER EDUCATION PROGRAM AT THE UNIVERSITY OF TENNESSEE, KNOXVILLE, BY THE GRADUATES

The number that appears at the top of the page is for Data Processing purposes only so that neither you nor your institution will be identified in any report or findings.

Directions: Please supply the information requested by checking the appropriate response or by writing the information in the spaces provided. Please answer all questions.

I

What is the nature of the work in your present position?

- ☐ Teaching Industrial Arts only
☐ Teaching Industrial Arts and other subjects
☐ Teaching Industrial Arts and working part time in Administration
☐ Working in Administration only
☐ Working in Industry (specify type of work) _____
☐ Working in private business (specify type of work) _____
☐ Other (specify type of work) _____

If you are teaching, list the titles of courses you currently teach. _____

II

A. List below all degrees you have received, the institution conferring each, and the year the degree was received.

Degree Received	Year	Institution Conferring Degree

B. If you are working toward an advanced degree, give the following information:

1. Type of degree _____ in _____ (Give major area, such as IA, EDU., ADM. Etc.)
 (M.S., Ph.D., Etc.)
 2. Institution _____
 3. Number of graduate hours completed to date _____
 4. Date you expect to receive the degree _____

C. Please indicate the type and amount of additional course work you have taken since graduating from the University of Tennessee.

Title of Course	Course #	Credit Hrs.	Length of course weeks or months

D. What was/is your primary reason for pursuing the education mentioned above?

- ☐ Does not apply
☐ To provide personal satisfaction
☐ To prepare for a new position
☐ To overcome inadequacies in previous preparation
☐ To maintain and/or improve competency for present position
☐ To qualify for an increment on the salary schedule
☐ Other (Please specify) _____

E. Was this education required by your employer?
☐ Yes ☐ No

III

Following are the undergraduate courses presently offered in the Industrial Arts Department of The University of Tennessee. Please place a check mark in the column which indicates the value of the course to you. Please remember to consider the last three columns.

Course Number and Title	COURSES TAKEN			COURSES NOT TAKEN		
	Maximum Value	Reason- able value	Minimum Value	Conflict in Schedule	Saw no need	Felt need since Graduation
1240 Welding & Cutting Prac						
1610 Engine Analysis						
1620 Graphic Comm.						
1630 Basic & Appl. Elect.						
1642 General Metals						
1661 General Woodworking						
2661 Power Mechanics						
2621 Architectural Graphics						
2631 Fund Appl. Electronic						
2641 Machine Tool Processes						
2652 General Plastics						
2660 Furn. & Cab. Const.						
3040-41-42 Phy. Test. Tech.						
3050 Welding, Brazing, Cut- ting, & Related Processes						
3060-61-62 Elect. Tech.						
3110 History & Phil. of IE						
3310 Shop Organ. & Mgt.						
3320-30 Mats. & Meth. for Tchng. Shop & Related Sub.						
3340 School Shop Safety						
3612 Automotive Mechanics						
3621 Industrial Graphics						
3632 Ind. Elect. & Equip. Ct						
3640 Adv. General Metals						
3651 Plastic Processing						
3662 Const. Meth. & Mats.						
3672 Graphic Arts Repro. Processes						
4210 Meth. Tchng. Shop & Related Subjects.						
4220 Lab. Equip. Maint.						
4310-20 Curr. Bldg Trade & Ind. Subjects						
4410-20 Directed Teaching						
4621 Special Topics Draft.						
4662 Const. Processes						
4670 Mfg. Processes						
4671 Materials & Processes						
4682 Power & Energy						
4691 Course Const. Ind. Art						

PERSONAL EVALUATION

1. Evaluate your undergraduate work in Industrial Arts at The University of Tennessee by indicating with a check in the appropriate column whether you consider your preparation to have been excellent, adequate, or limited.

	Excellent	Adequate	Limited
A. Engaged in a variety of Industrial Experiences in laboratory classes.			
B. Developed skill in the use of hand and machine tools.			
C. Studied Industrial Safety Procedures and practiced safe work habits.			
D. Received meaningful general information concerning industrial processes.			
E. Received technical information as related to specific areas.			
F. Learned creativeness in design and construction.			
G. Encouraged to do critical thinking.			
H. Encouraged to read and remain abreast of related literature.			
I. Other (Please specify) _____			

2. What specific course or courses would you recommend to strengthen the Industrial Arts Curriculum?

3. The following listing indicates various approaches to classroom situations. Do you consider the following to be strong points or weak points of the program.

	Strong Point	Weak Point
Group Projects		
Group Research		
Individual Instruction		
Individual Research		
Experimentation		
Realistic Industrial Application		
Industrial Orientation		
Laboratory Experiences		
Technically Related Information		
Other (Please specify)		

4. On the basis of your past occupational experiences, would you recommend more or less preparation in the following: (Please check the appropriate box for each area)

	More	Less	No Change
Mathematics			
Physics			
Physical Science			
Chemistry			
Economics			
Business Administration			
Professional Education			
Technical and/or Report Writing			
Technology			
Other (Please specify)			

5. What do you consider presently to be the chief advantages of a career in Industrial Arts? (Rank five in order of importance, with the number one (1) representing the most advantageous, two (2) the second most advantageous, etc. Rank FIVE only)

- ☐ Provides opportunity to work with individuals with similar interests.
☐ Provides opportunity to work closely and directly with people.
☐ Provides high degree of security.
☐ Provides content based on human needs, e.g. creativity, exploration, and excellence.
☐ Provides excellent salary.
☐ Provides opportunity to be involved with problem solving experiences.
☐ Provides experiences that are vital concrete, intriguing and challenging.
☐ Provides versatile experiences which enables individuals to pursue work in either education or industry.
☐ Other (Please specify) _____

6. If you entered teaching since graduation and later left teaching to secure employment in another field, what was the one most important reason for doing so?

- ☐ Question does not apply to me.
☐ Better salary than teaching.
☐ More security than teaching.
☐ Inadequate preparation for teaching.
☐ Better chance for advancement than teaching.
☐ Less restrictiveness than teaching.
☐ Other, (Please specify) _____

7. If you entered an occupation other than teaching since graduation and later entered teaching, what was the one most important reason for doing so?

- ☐ Question does not apply to me.
☐ Better salary than in previous occupation.
☐ More security than in previous occupation.
☐ Better preparation than in previous occupation.
☐ Better chance for advancement than in previous occupation.
☐ Less restrictiveness than in previous occupation.
☐ Other (Please specify) _____

APPENDIX B

ORIGINAL LETTER TO FORMER GRADUATES



VOCATIONAL
TECHNICAL
EDUCATION

THE UNIVERSITY OF TENNESSEE

DEPARTMENTAL OFFICE: 110 HENSON HALL - COLLEGE OF EDUCATION - KNOXVILLE, TENNESSEE 37916 (615) 974-2574

Dear Former Graduate:

As a former University of Tennessee undergraduate in Industrial Arts Education, we would very much appreciate your help. Continuing to make the same mistakes over the years is a condition we would like to avoid. We also would like to know if anything that was experienced during your program was useful.

Please be honest with us. Keep in mind there will be many students who will be required to take many of the courses you have taken. We plan to listen to your advice and make changes where you tell us it's appropriate.

Mr. Robert Harrison, a doctoral candidate in our department, is conducting this study. Let us assure you, he will not be sharing what you say about us directly. Rather, he will be compiling the data and he will make recommendations in his dissertation that will affect the program.

Sincerely,

Robert R. Hanson &
Randal Pierce

nw

APPENDIX C

CONSENT FORM

You are invited to participate in the study dealing with the Evaluation of the Industrial Arts Teacher Education Program at The University of Tennessee. You were selected because you received a baccalaureate degree in Education with a major in Industrial Arts between July 1, 1971 and June 30, 1980.

The purpose of this study is: a. To develop a graduate profile consisting of present location, occupational status, and amount of advanced training; b. To determine the graduates perceived advantages of a career in Industrial Arts and preparation for this at The University of Tennessee, Knoxville; c. To determine the adequacy of the basic subject areas of Industrial Arts; and d. To obtain suggestions for improving the Industrial Arts program at The University of Tennessee, Knoxville.

A request is being made that you complete a questionnaire. The questionnaire will be numbered so that follow-up procedures can be made if necessary. However, as soon as data are collected, it will be coded in order to ensure that you cannot be identified in the report of the study.

Your decision whether or not to participate will not, in any way, prejudice your future relations with The University of Tennessee. If you decide to participate, you are free to withdraw your consent and to discontinue participating at any time without prejudice. I invite your participation, and if you do so, I will appreciate it.

This certifies that the person signing this form has participated of his or her own free will in the study, "An Evaluation of the Undergraduate Industrial Arts Teacher Education Program at The University of Tennessee, Knoxville," and is free to withdraw his or her consent and to discontinue participation in this study at any time without prejudice. In the event of physical injury resulting from the research procedure, financial compensation is not available and medical treatment is not provided free of charge. The researcher assures confidentiality of all information.

Signature

Current Address

Researcher:
Robert G. Harrison
1611 Laurel Avenue
Apt. 1307
Knoxville, Tennessee 37916
Telephone: 637-1109

Major Professor:
Dr. Donald V. Brown
122 Henson Hall
Dept. of Vocational-Technical Education
The University of Tennessee
Knoxville, Tennessee 37996-3315
Telephone: 974-2574

APPENDIX D

FIRST REMINDER LETTER

A FRIENDLY REMINDER

TO: _____

SUBJECT: An Evaluation Of The Industrial Arts Teacher Education
Program At The University Of Tennessee By The Graduates.

MESSAGE: HELP!! Please complete the enclosed questionnaire and
consent form and send them in. Your contribution is VITAL
to the success of this study.

Your attention is greatly appreciated.

Bob Harrison

(Kindly disregard this reminder if you have already completed and
mailed the forms requested)

APPENDIX E

SECOND REMINDER LETTER

DATE: July 31, 1982

SUBJECT: AN EVALUATION OF THE UNDERGRADUATE INDUSTRIAL
ARTS TEACHER EDUCATION PROGRAM AT U.T.-K BY
ITS GRADUATES.

MESSAGE: Please take the time NOW to complete and return
the questionnaire you received recently so that
analysis of the data can begin. The success
and validity of this study depend on your par-
ticipation.

Sincerely yours,

Robert G. Harrison
Researcher

Kindly disregard if you have completed and mailed the forms.

VITA

Robert Gordon Harrison was born in Jefferson, North Carolina, on September 14, 1946. He was educated in the Ashe County public schools, graduating from Ashe Central High School in 1964.

He entered Lees-McRae Junior College, Banner Elk, North Carolina, in 1964, obtaining an Associate of Arts degree in 1967. From 1967 to 1969, he attended Appalachian State University, Boone, North Carolina, and received a Bachelor of Science degree in Social Science with a minor in Secondary Education.

Upon obtaining this degree, he returned to Jefferson, North Carolina, to accept a teaching and coaching position at Ashe Central High School. In 1972, he accepted a supervisory position in industry where he remained until returning to Appalachian State in 1974 to complete a Master's degree in Industrial Arts.

Following graduation in 1975, he accepted a one-year teaching position in metals technology at the University of Southern Maine, Gorham. He then moved to Oak Ridge, Tennessee, in 1976 to teach industrial arts at Jefferson Junior High School and to attend The University of Tennessee, Knoxville, where he pursued a doctoral degree in the Department of Vocational-Technical Education. The major emphasis of his study was general Vocational-Technical Education with a cognate area in Curriculum and Instruction. He was awarded the degree of Doctor of Education in 1983.

While in residency at The University of Tennessee, Knoxville, he was employed as a teaching assistant, having primary responsibility

for teaching undergraduate courses in Industrial Arts Teacher Education. In addition, he participated in a project sponsored by the Division of Vocational Education, Tennessee State Department of Education, for developing alternative training and certification models for Trade and Industry and Health instructors in Tennessee. Currently, he holds membership in several leading professional organizations.

He is married to the former Lenna Lyall of Crumpler, North Carolina.