A STUDY OF THE COURSE OFFERINGS IN MACHINE WOODWORKING I
AND II IN THE HIGH SCHOOLS IN THE STATE OF TEXAS TO
ASCERTAIN IF ANY DEVIATIONS ARE MADE FROM THE
STATE PREDESCRIBED COURSE OF STUDY

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By

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CHAPTER I

INTRODUCTION

Statement of the Problem

This is a study of the course offerings in machine woodworking I and II in the high schools in the state of Texas to ascertain if any deviations have been made from the state pre-described course of study to meet the individual needs of the community.

Purpose of the Study

The purpose of this study is to determine whether any deviation is made between the state predescribed course of study and the curriculum offerings as taught by the teachers in the individual school districts.

In tracing curriculum differences between the industrial arts programs in the secondary schools of Texas, the following factors were considered: (1) What are the school curriculum offerings in machine woodworking I and II in the various high schools? (2) Do the high school offerings agree with the pre-described curriculum content as mentioned by the Texas Education Agency? (3) In what ways do these curriculum offerings differ from the predescribed offerings?
Limitations of the Study

This study was limited to only the ninety-six accredited high schools in Texas which offered both machine woodworking I and II. In order to determine the creditability of the individual schools, mimeographed material entitled Industrial Arts in Texas 1966-1967, was used. This study did not include training schools of junior and senior colleges, private schools, institutions, or technical trade high schools.

Source of Data

The data used in this study were obtained from books, publications from the Texas Education Agency, and questionnaires received from seventy-two, or 73.4 per cent, of the ninety-eight high school teachers in Texas which teach both machine woodworking I and II.

Method of Procedure

This study is divided into five chapters. Chapter II is devoted to a study of the curriculum offerings and course content suggested by the Texas Education Agency. This study was made in order to obtain a more thorough knowledge of the overall picture of curriculum offerings in industrial arts machine woodworking I and II in the state of Texas.

1Texas Education Agency, Industrial Arts in Texas 1966-1967 (Austin, Texas).
The data in Chapter III refers to the instructional staff and course content. Chapter IV contains an analysis of present course offerings, with emphasis on variations from the pre-described course offerings for machine woodworking I and II. Chapter V includes the summary of the first three chapters and the conclusions that seem to be the most outstanding. The recommendations are also included in Chapter V.

Definition of Terms

Certain terms are pertinent to the study and are defined as follows:

**Industrial arts** includes those phases of general education which deal with industry—materials, occupations, processes, and products—and with the problems resulting from the industrial and technological nature of society.\(^2\)

**Secondary schools** are the schools which provide secondary education. These schools include the four grades—ninth, tenth, eleventh, and twelfth, preceding college or university study.

**Accredited high schools** are those schools which meet the standards of the Texas Education Agency for accreditation.

**Instructional staff** are those teachers who actually do the instructing in the secondary industrial arts classes.

**Curriculum offerings** refer to the entire scope of learning opportunities provided by the school.\(^3\) Curriculum is the total

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series of learning opportunities provided by a particular school for its own student body. The curriculum plan in turn gives guidance to groups of teachers and individual teachers in providing learning opportunities for the particular learner.\textsuperscript{4}

Predescribed course of study refers to the course of study which is recommended by the monograph entitled \textit{Woodworking, Grades 7-12}, prepared for the Texas Education Agency by the Texas Industrial Arts Association.

General Shop is a term applied to the type of shop organization in which several phases of industrial arts training are in process at the same time.

Recent and Related Studies

Research revealed that there had been few studies made directly concerning the curriculum content in machine woodworking I and II in the secondary schools of Texas. Of the studies reviewed, the following were found to be most pertinent.

In 1967, B. M. Moore made a study in which he attempted to gather the most current available information concerning the qualifications and status of industrial arts teachers in Texas. His study included 152 public schools of Texas.

\textsuperscript{4} Ibid., 6.

\textsuperscript{5} Billy M. Moore, "A Study of the Qualifications and Status of Industrial Arts Teachers in Texas," unpublished master's thesis, Department of Industrial Arts, North Texas State University, Denton, Texas, 1967.
He found, through the use of questionnaires, that the typical industrial arts teacher taught woodworking and drafting courses each day. 6

Moore observed that of the industrial arts teachers included in his study 83.5 per cent taught only industrial arts classes. The non-industrial arts class taught most often by industrial arts teachers was actually driver-education. 7

The typical teachers involved in Moore's study had held one previous teaching position but had been in his present position for six to eight years. 8

Joe H. Parmer prepared a study in 1939 concerning whether or not the colleges of Texas were preparing its students of industrial arts to teach effectively in the high schools of Texas. 9 His study relates to this report in two ways.

Farmer's study revealed that out of 214 senior high schools included in this study, eight industrial arts teachers had taught between twenty and thirty years; twenty-one between fifteen and twenty years; thirty-five between ten and fifteen years; twenty-nine between five and ten years; seventy-one between one and five years; and one reported the minimum of 4.5 months. 10

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6 Ibid., p. 83.  
7 Ibid.  
8 Ibid.  
9 Joe H. Farmer, "To Determine Whether or Not the Colleges of Texas Are Preparing Their Students of Industrial Arts to Teach Effectively in the High Schools of Texas," unpublished master's thesis, Department of Industrial Arts, North Texas State University, 1939.  
10 Ibid., p. 62.
Approximately sixty-five per cent of the 214 teachers included in Farmer's study were teaching three of the most frequently taught units—hand woodwork, mechanical drawing, and machine woodwork. 11

Carroll B. Pippin made a study to determine if the vocational education and industrial arts program of the Orange, Texas, Public Schools were meeting the needs of the community. 12 He sent questionnaires to present students, former students, parents of present students, and parents of former students in order to obtain information concerning the student use of the vocational or industrial training received in the high schools of the Orange Public Schools district.

Pippin reported that both the vocational education and the industrial arts programs were inadequate at Orange High School. The department was inadequate in both machinery and necessary materials. 13 He concluded by saying that the vocational education and industrial arts programs of the Orange High School were to some extent meeting the needs of the community. 14

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11 Ibid., p. 63.
12 Carroll Bryant Pippin, "A Survey to Determine if the Vocational Education and Industrial Arts Program of the Orange Public Schools is Meeting the Needs of the Community," unpublished master's thesis, Department of Industrial Arts, North Texas State University, Denton, Texas, 1949.
13 Ibid., p. 93.
14 Ibid., p. 94.
David R. Enderby made a study in 1950 concerning the industrial arts programs of the teacher training institutions of Oklahoma to determine if the teachers in the high schools of Oklahoma were receiving adequate training.\textsuperscript{15} He used a questionnaire which was sent to the high school teachers in the field of industrial arts. His findings were that the instructors were not teachers of a single industrial field; they were teachers of a variety of industrial fields.\textsuperscript{16} He also reported that the average number of years of teaching experience for each teacher was eight and six tenths.\textsuperscript{17}

Robert H. Glenn made a study of the qualifications and general status of the industrial arts teachers employed in the secondary schools of Arkansas during the 1953-1954 school year.\textsuperscript{18} Two aspects of his study are of some value to this study. \textsuperscript{(1)} The average number of students taught daily by the thirty-seven industrial arts teachers was 107.\textsuperscript{19} \textsuperscript{(2)} The industrial arts teachers in Arkansas were prepared adequately only in woodwork, drawing, and metal work.\textsuperscript{20}

\textsuperscript{15}David R. Enderby, "A Study of the Industrial Arts Programs of the Teacher Training Institutions of Oklahoma to Determine if the Teacher of Industrial Arts in the High Schools of Oklahoma Are Receiving Adequate Training," unpublished master's thesis, Department of Industrial Arts, North Texas State University, Denton, Texas, 1950.

\textsuperscript{16}Ibid., p. 74.

\textsuperscript{17}Ibid., p. 73.


\textsuperscript{19}Ibid., p. 77.

\textsuperscript{20}Ibid., p. 78.
In 1966, a study entitled *Industrial Arts Education--A Survey of Programs, Teachers, Students, and Curriculum* was made by Marshall L. Schmitt and Albert L. Pelley. Their study was a nationwide survey of the 1962-1963 school year. The research indicated, among other things, that the average number of years of teaching experience was nine and five tenths years.  

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22 Ibid., p. 29.
CHAPTER II

AN ANALYSIS OF THE CURRICULUM OFFERINGS AND COURSE CONTENT
AS OUTLINED FOR MACHINE WOODWORKING I AND II BY
THE TEXAS EDUCATION AGENCY

A study of the Texas Education Agency monograph entitled, Woodworking, Grades 7-12, was made to determine the best guidelines for students in machine woodworking I and II in the secondary schools of Texas. The monograph was prepared by the Texas Industrial Arts Association. The chairman of the committee was Ronald L. Foy, Snyder High School, Snyder, Texas, and included other noted teachers in the woodworking field.

The curriculum offerings for machine woodworking I and II as set up by the Texas Education Agency were designed to refine and increase skills taught in secondary schools over the state of Texas. The course content included a survey of the woodworking production methods and the necessary skills in shop operation and machine maintenance. Student projects were to require extended periods of work on complicated machine setups and operations.

Machine woodworking includes machine and tool maintenance, which involved the care of machines, benches, portable machines, and hand tools. Related technical information and safety

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1 Texas Education Agency, Woodworking, Grades 7-12 (Austin, Texas, 1965), p. 36.
instruction are mutually correlated with the instruction of machine operation and maintenance. Other areas of concentrated study include products of the woodworking industries, historical periods of furniture, characteristic distinctions between the many different kinds of woods, methods of logging, sawing, grading, classifying, and careers in woodworking industries.

State Suggested Course of Study for Woodworking I

The grade placement for machine woodworking I, as suggested by the monograph entitled, *Woodworking, Grades 7-12*, is grades ten through twelve. The initial part of machine woodworking I is a review of the prerequisite general woodworking. The student must master everything listed in the following review.

Reading and understanding are of prime importance to the student of industrial arts. The student will learn the different types of drawings, along with the alphabet of lines. Design of the project and project planning also include general knowledge about a working drawing. With a complete set of working drawings, a student should determine how much lumber he will need and how much the said lumber will cost. The student should determine the price, providing he is alert about purchasing policies used by industry and his local school.

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2 Ibid.
The best time to determine the types of wood joints needed and the type of fasteners and hardware desired is during examination of the working drawing.

The use, care, and maintenance of power tools such as saws, jointers, planes, portable drills, drill presses, sanders, wood-turning lathes and routers should be known before the student attempts any machine operation. The hand tools such as saws, planes, chisels, boring and drilling tools, and measuring and layout tools are the basic tools with which the student must be thoroughly familiar before he can attempt complicated machine operational setups. The student must realize that safety education is a major phase of the instructional program in woodworking. According to the Agency's monograph, machine operational safety and hand tool safety are very essential before a student begins any industrial operation.

Industrial arts involves instruction in the use and production of lumber. Not only is the student taught the characteristics and differences between the various kinds of trees, but he also learns how the lumber proceeds from a tree to a board ready to be used. Thus, a vast horizon of woodworking occupations opens up.

The public is attracted to a piece of furniture by its design, color, or usefulness; therefore, the student of industrial arts machine woodworking needs to be aware of the vast area of design. He must realize that creative planning must meet a

\[3\text{Ibid., p. 59.}\]
specific need. The specific need is followed by the visual image in the student's mind. After the image is developed mentally and on paper, the student should begin thinking about the kind of material needed and the construction steps involved. The visual image is used to determine the kind of design, whether it be structural or decorative. After the student has developed the type of design, he must then think of the principles of design, such as formal balance or informal balance, unity, proportion, and repetition of rhythm. Design must be carefully planned and considered by the student before beginning project work. The student should also be taught some of the related information about design in industry and design of machines.

The Agency has recommended that a project must be planned after the design has been decided upon. Planning a project involves four major steps of careful consideration before the student is actually ready to go to the stock room.

The first major consideration is selection of a project. Before the student can begin a project, he must consider the following questions: can the student use the project, what is the estimated cost of said project, will this project be compatible with other home furniture, is the student capable of completing the project, and will the project demand new experiences? The instructor can help the student to help himself in selecting a project by suggesting some procedures, such as collection, selection, and development of ideas.
After the student has selected the project, he must then turn his attention to the second major step in project planning. Selection of materials is equally important as selection of a project. The materials available to the student must have three characteristics. First, the available material must have adaptability to working situations. Secondly, the material must be of good durability. The last feature and possibly the most important is the workability of the material. The student must consider all of the above features before he makes his decision about desirable materials.

The third major step in project planning is construction organization, which must begin with a working drawing or illustration. The next move is to complete a bill of materials. The most important step of the organization is the working procedures, which must be formulated prior to beginning a project.

The fourth and final step of project planning is the selection of an appropriate finish. The student must be aware of the many types of finishes, the durability of certain finishes, the cost of applied finishes, application of various finishes, and the time involved in obtaining a desirable finish. The quality of a finish is often dependent upon the finishing equipment. The student must also consider the degree of difficulty involved in using certain types of equipment. After he has considered the selection of the project, selection of materials, the planning of the project, and the selection of appropriate finishes, he will be prepared to
begin his operational steps involved in completion of a project.

Jigs and Fixtures

Jigs and fixtures are tooling devices designed and built to be used while making several parts in some phase of industry. Templates are patterns or guides used to determine size or shape of an object to be made from raw material.

Many features go into the design of a good jig or fixture. The Texas Education Agency recommends that the student in machine woodworking I and II follow a designated set of steps to achieve a well-designed jig or fixture.

The first step in designing a jig is determining the type of jig needed. The following types of jigs and fixtures pertain only to the woodworking industry. Drill jigs are either used for cylindrical stock or for multidrilling. Assembly jigs are used in assembling many identical pieces. The bending jig is used exclusively on projects which require an unusual bend or turn. Contour jigs should be either a clamping type or a cradle-holding type. Finishing and trim jigs are both designed to benefit the final appearance of the completed project.

The student's awareness of the basic principles of good jig or fixture design will help with its construction. According to the Agency, the student must first be acquainted with the various types of jigs. He must then know the basic dimensions of the jig and whether it will be compatible with its different operations. The best location for the jig, the ease
of loading and unloading the tool, and the size and kind of material to be used, must all be considered before undertaking its construction. The student must also determine how the jig is to be anchored to the machine. It is important that the student know how to care and store the various types of jig or fixture properly.

The Agency goes on to suggest that the student be familiar with some of the simpler jigs designed for use on some of the more commonly used machines. The radial arm saw, the circular saw, the jointer, the band saw, the wood-turning lathe, and the shaper are the basic machines that a student in machine woodworking I uses during the course year.

Power Woodworking Machinery

The student in industrial arts must be taught both simple setups as well as the complex setups, when using the power woodworking machines. Before he begins his study of the various machines, he must be made aware of the individual safety procedures for each individual machine. The power machines with which the student is concerned in machine woodworking I are the circular saw, jointer, shaper, surfacer, drill press, band saw, disk and belt sander, and the wood-turning lathe.

It is recommended that the student know various methods of cutting wood stock when using the circular saw. Crosscut, ripping stock, resawing stock, and cutting duplicate lengths are all methods of cutting stock. The monograph also suggests that the student know the way to cut a woodworking joint with
the circular saw. Some of the joints which can be cut on a circular saw are as follows: rabbet joints, dado joints, groove joints, miter joints, spline miter joints, tenons, gains, and tongue-and-groove joints. Other cuts, such as tapers, bevels, angles, and cove cuts, can also be made on the circular saw.

The Agency recommends that the student become familiar with the jointer. The jointer is used to joint an edge or end of a board, to surface narrow stock, to cut a rabbet edge, to cut bevels and chamfers, and to cut tapers.

The shaper is a very necessary but dangerous machine in the woodworking shop. Some of the operations which the student can perform with this machine are as follows: shape molding cuts on straight, curved, and irregular surfaces and edges, shape molding cuts for inside curves, molding flutes and reeds, duplicate molding cuts using pattern jigs and shape-stopped moldings.

The student uses the surfacer in many advantageous ways. The surfacer is capable of performing the following operations: surface stock to thickness, surface narrow stock, and surface thin stock using backing boards.

The drill press is a very versatile machine, with which every machine woodworking student must become familiar. Straight drilling, angular drilling, and routing are a few of the operations that the Agency recommends. The student
should know how to change drills for routing and shaping. The drill press is also used commonly by students to drill plastics, metals, and composition materials.

The industrial arts machine woodworking student must be aware of the operations which can be performed with the jig saw. The following operations can be performed on the jig saw; sawing outside and inside curves, cut piece and fret work, sawing composition type of materials, saber sawing, special filing operations, and light metal sawing.

It is suggested that the student know how to perform various operations on the band saw, such as sawing irregular lines, ripping stock to given lines, cutting off stock, resawing stock with a jig, ripping stock with a fence, sawing tenons, cutting slip joints, and bevel cutting with a tilted table.

The disk and belt sander is a very useful machine, providing the student receives the proper orientation about the machine's operations. The disk and belt sander is capable of performing such duties as sanding flat surfaces, sanding end and edge grains, and sanding curved surfaces. The student must also know how to change belts and disk paper.

The wood-turning lathe has many operational uses other than making a simple machine turn screw adjustment. The machine wood-turning lathe involves such procedures as centering stock in lathe, mounting work between centers, roughing work with a gouge, smoothing work with a skew, marking off
patterns on stock, cutting shoulders with skew, cutting tapers with a skew, cutting beads and convex surfaces with a skew, scraping with a skew, cutting concave curves with a gouge, scraping with a square-nose chisel, cutting shoulders with a square-nose chisel, using a parting tool, using a spear-point tool, using a round-nose tool, and using calipers for exact turning.

It is recommended by the Agency that every student in machine woodworking be aware of certain general facts and information about each power machine. The machines recommended by the Agency are the circular saw, jointer, shaper, surfacer, drill press, jig saw, band saw, disk and belt sander, and the wood-turning lathe. The general facts which he must know are the types and sizes of all the above-mentioned machines. It is also recommended that the student know how to care for and make the various adjustments on these machines. The student should be aware of the range of work which may be performed on a given machine, the functions of the working parts, motor size, revolution per minute, and over-all machine construction.

According to the Agency the student in machine woodworking will acquire certain knowledge, which is not mentioned above, about the machines that he uses daily. The student operating the circular saw must know how to change saw blades, dado heads, and other accessories. It is recommended that he know how to joint saw teeth, gum, set, and file the circular saw teeth. It would be desirable for the student operating the jointer
to know how to remove, grind, balance, whet, and replace jointer knives. The shaper operator must know how to put on the shaper cutters correctly, and know the many combinations of shaper knives. The drill press has one aspect beyond what was previously mentioned by the Agency. The student needs to know the different kinds of drills and bits used in the drill press. The student operating the jig saw needs to be aware of the procedure followed in order to change blades for different kinds of work. The student operating the band saw must know how to change blades and the methods of reconditioning and repairing the blades. Wood-turning lathe operators in the high school woodworking laboratories need to be aware of the methods of applying abrasive papers to the disc, as well as information about the various abrasive grits.

This list of machine operations and student attainments is not inclusive. Some of the machines listed above are very overlapping in terms of distinction between intricate machine operations and general or over-all operating principles. Many of these same operations and principles will lap over also into the portable power tool operations and procedures.

Portable Electric Power Tools

The discussion of curriculum content by the committee from the Texas Education Agency in regard to the portable electric power tools begins with the most important feature first—safety. Safety instruction should proceed any initial work
done with the portable electric power tools by any machine woodworking student.

The Agency recommends that safety instruction on portable electric power tools begin with a section on ground wires and connections. The next section includes clamping devices for holding material. With the above two safety practices in mind, the student can then begin to work with the correct operational procedures.

The instructor has responsibilities toward use and care of portable power tools which do not necessarily involve the student directly. It is his responsibility to see that suitable storage is provided for the power tools. An inspection must be made frequently, checking the wiring, plugs, switches and bushings. The instructor must see that every power tool is oiled and greased. The clearing of air inlets and outlets is also his responsibility.

The Agency recommends that students in machine woodworking know the safe operation of the following portable electric power tools: the portable electric hand drill, the portable electric bayonet, saber, and jig saws, the portable electric hand saw, the portable electric router, and the portable electric belt, disk, and orbital sanders.

Abrasives

The student in machine woodworking is required to know much about the abrasives industry. He must know the purposes, as well as the classification, of abrasives. Coated abrasives, which include the various types of abrasives, backing, adhesives,
coatings, flexibility of backing, classes of coated abrasives, preparation of abrasive grains, and grades of abrasive grains are also included in curriculum offerings in machine woodworking. Abrasive flours, which include classes of flours such as rottenstone, pumice, tripoli, and diatomaceous silica, will also be included in the over-all curriculum. This section also includes the selection of the proper abrasive in the use of the grinder, disc sander, and portable sanders—belt, disc, orbital, and straight-line.

The Agency reports that if the student is properly taught the section on abrasives, he will be able to accomplish the following: (1) the selection and use of the proper coated abrasive, (2) the preparation of surfaces for finishing with sanding machines, and (3) the ability to recognize types, grades, grits, and the principle uses of abrasives used in the woodworking industry.5

Finishes

The section on finishing, according to the Texas Education Agency, begins with recognition of the general purposes of finishing. The monograph recommends that four purposes be recognized at the time the instructor plans his yearly curriculum. The first of these purposes is the enhancement of the beauty of a project. The second purpose is preservation of the wood of the project. Stability and sanitation are the third and fourth purposes.

5 Ibid., p. 51.
The student of machine woodworking must understand the preparation of surfaces for finishing. The Agency lists four aspects that are involved in surface preparation. The selection of the proper abrasive, sponging and resanding, preparation of defects, and removal of dents, are the main factors which the monograph recommends for the student.

It is recommended that the student be taught about certain finishing materials and finishing procedures before he attempts to finish any woodworking project. These materials and procedures are as follows: stains and staining, wood fillers, varnishes, shellacs, lacquers, bleaching, paints, enamels, abrasive flours, and polishes and waxes. He must also be instructed in the proper use of the following equipment and supplies: paint brushes, paint rollers, spray equipment, paint and varnish removers.

The industrial arts department must always maintain a certain level of safety precaution in the finishing rooms or spray booths. General safety of the finish room should include ventilation, lighting, exhaust systems, handling of materials and waste, storage and proper labeling of materials, protective equipment, good housekeeping, and fire fighting equipment, along with its proper usage.

The student in machine woodworking should have a suggested finishing schedule to use as a guide for future finishing work. The following is a schedule recommended by the Agency: the preparation of surfaces, bleaching, staining, wash coat,
filling, sealing, shade or glaze, finish coats, compound polish and wax.

The Agency states that if the instructor follows the above curriculum recommendations, in regard to finishing a project, the student will appreciate fine furniture finishes, develop a pride of workmanship, prepare several types of surfaces for finishing, prepare fillers for different kinds of woods, prepare and apply different stains, and know several types of finishes and methods of cleaning and caring for finishing materials and equipment.

The industrial arts woodworking laboratory must also be equipped with materials which are necessary to obtain the different types of finishes on projects. Brushes, spray booth or room, drying room, abrasives, bleach, wood doughs, stick shellac, electric pressing iron, stains, fillers, sealers, glaze, shading lacquers, toners, finish coat materials, solvents and thinners, metal storage cabinet for finishing materials, and a covered metal waste receptacle are all required to make a finishing room complete to meet the Agency's standards.

Machine Woodworking II.

Machine Woodworking II, grade placement 11-12, is a follow-up course, with machine woodworking I as a prerequisite. The student in woodworking II should obtain a high degree of

Ibid., p. 64.
skill and craftsmanship in millwork and furniture making through the completion of extended periods of work on complicated machine setups and operations. Actual application, where desirable, will be introduced, involving the principles and procedures of the building trades. The student will study the technical information pertaining to consumer knowledge and specific courses in the woodworking field.

"Machine woodworking II should be designed to meet the specific needs of the community." The student in woodworking II should have already gained credit for two previous years of woodworking, and should have attained some degree of skill, accuracy, and knowledge about the woodworking industry. In machine woodworking II, the instructor should strive to accomplish the course objectives that are set forth by the Agency.

To develop the quality of craftsmanship using tools, materials, machinery, and processes of industry equal to that of the industrial job shop.
To provide related technical information in selecting careers in the woodworking industries.
To provide experiences in making complicated machine setups and operations using woodworking machines correlated with production jobs and students' projects.
To provide related technical information, safety precautions, and experiences correlated with tools, machine maintenance, and operation procedures.
To provide related technical information and experiences in the range of building and milling materials of the wood industry, purchasing, storing, and handling of supplies.
To provide related technical information and experiences in custom and production finishing techniques with natural and synthetic resins in the woodworking industry.
To provide for historical research, design and planning, and to evaluate workmanship in products.

\(^7\text{Ibid.}, p. 56.\)
of the industries; emphasis should be placed on cabinet making and the construction of other complicated woodworking projects.8

Machine woodworking II is a course which offers the instructor an opportunity to work individually with the student in obtaining his individual objectives. Specialization in several areas should be encouraged during this course. Carpentry, fabrication, experimentation, finishing, and refinishing are among the specialization areas which are recommended for the student by the Agency.

The instructor must keep in mind that each student is an individual and that his interests will vary greatly from those of other members of his class.

The basic resume of the entire machine woodworking II section revolves around the idea that the course will be designed and planned to meet the needs of the school, the community, and the individual student.

8 Ibid.
CHAPTER III

PRESENTATION OF DATA FROM INSTRUCTORS WHO TEACH MACHINE WOODWORKING I AND II IN THE HIGH SCHOOLS OF THE STATE OF TEXAS

This chapter presents data concerning the curriculum content of seventy-two high-school industrial arts woodworking instructors. A questionnaire was designed and mailed to the ninety-eight teachers of the high schools who offer both machine woodworking I and II. The questionnaire was completed and returned by seventy-two, or 73.4 per cent, of the teachers located in the various parts of the state. A copy of the questionnaire is included in the Appendix.

The data received from the teachers were given careful consideration, and an attempt has been made to determine what is included in industrial arts woodworking I and II in the public schools of Texas. The questionnaire secured information pertaining to teaching experience, teaching load, course objectives, prerequisite student understanding of working drawings, power tools and hand tools used by students, common woodworking construction joints, project planning, selection of materials, jigs and fixtures, operation of power machinery, portable power tools, abrasives, the use and preparation of finishes, and available materials. These data will be presented through the use of tables and an illustration. Figure 1 shows
the approximate location of the high schools that are represented in this study.

![Map of Texas showing the location of high schools]

Fig. 1--Location of the high schools represented in the study.

According to the *Industrial Arts in Texas 1966-1967* directory of industrial arts teachers, the study is inclusive, and includes all high schools that offer both industrial arts machine woodworking I and II in the state of Texas.

Table I contains data concerning the number of years of teaching experience of the seventy-two respondents. According

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to these data, a larger number of teachers fell within the four- to six-year interval.

TABLE I

THE NUMBER OF YEARS TEACHING EXPERIENCE OF INDUSTRIAL ARTS TEACHERS

<table>
<thead>
<tr>
<th>Number of Years Teaching Experience</th>
<th>Number of Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-3</td>
<td>9</td>
</tr>
<tr>
<td>4-6</td>
<td>17</td>
</tr>
<tr>
<td>7-9</td>
<td>8</td>
</tr>
<tr>
<td>10-12</td>
<td>7</td>
</tr>
<tr>
<td>13-15</td>
<td>10</td>
</tr>
<tr>
<td>16-18</td>
<td>8</td>
</tr>
<tr>
<td>19-21</td>
<td>4</td>
</tr>
<tr>
<td>21- or over</td>
<td>9</td>
</tr>
</tbody>
</table>

Table II contains data concerning the number of sections of both machine woodworking I and II taught by teachers in the state of Texas. It was found that the greatest percentage of the teachers taught two sections of machine woodworking I and two sections of machine woodworking II. From the data obtained it was found that the teachers involved in this study taught an average of four sections of both machine woodworking I and II daily. Further treatment of the data revealed that one respondent taught six sections of machine woodworking I daily, and that one respondent taught one section of machine woodworking II daily. The data also revealed that 43.6 percent of the teachers taught two sections of machine woodworking II.
TABLE II
THE NUMBER OF MACHINE WOODWORKING SECTIONS TAUGHT DAILY BY INDUSTRIAL ARTS TEACHERS

<table>
<thead>
<tr>
<th>Daily Sections of Machine Woodworking</th>
<th>Number of Teachers</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>II</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>23</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>35</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>15</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

Table III contains information concerning the average number of students taught daily by teachers. The greatest percentage taught from seventy-six to one hundred students per day. Further analysis of the data revealed that between 151 and 175 students were taught each day by one teacher. The largest percentage of teachers taught approximately 100 students, while the smallest percentage of teachers taught approximately 170 students per day.
TABLE III
THE NUMBER OF STUDENTS TAUGHT DAILY BY SEVENTY-TWO INDUSTRIAL ARTS TEACHERS

<table>
<thead>
<tr>
<th>Number of Students</th>
<th>Number of Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>51-75</td>
<td>8</td>
</tr>
<tr>
<td>76-100</td>
<td>27</td>
</tr>
<tr>
<td>101-125</td>
<td>25</td>
</tr>
<tr>
<td>126-150</td>
<td>11</td>
</tr>
<tr>
<td>151-175</td>
<td>1</td>
</tr>
</tbody>
</table>

Table IV presents data concerning the other areas of industrial arts that are taught. The largest percentage of

TABLE IV
AREAS OF INDUSTRIAL ARTS OTHER THAN MACHINE WOODWORKING I AND II TAUGHT BY WOODWORKING TEACHERS

<table>
<thead>
<tr>
<th>Industrial Arts Area Taught</th>
<th>Number of Teachers</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical Drafting</td>
<td>16</td>
<td>22.2</td>
</tr>
<tr>
<td>Metals</td>
<td>8</td>
<td>11.1</td>
</tr>
<tr>
<td>Crafts</td>
<td>6</td>
<td>8.3</td>
</tr>
<tr>
<td>Machine Woodworking III</td>
<td>6</td>
<td>8.3</td>
</tr>
<tr>
<td>Machine Woodworking IV</td>
<td>6</td>
<td>8.3</td>
</tr>
<tr>
<td>General Shop</td>
<td>5</td>
<td>6.9</td>
</tr>
<tr>
<td>Power Mechanics</td>
<td>2</td>
<td>2.7</td>
</tr>
<tr>
<td>Electricity-Electronics</td>
<td>1</td>
<td>1.3</td>
</tr>
<tr>
<td>None</td>
<td>29</td>
<td>40.2</td>
</tr>
</tbody>
</table>
the teachers reported to be teaching only machine woodworking I and II. Of the teachers who taught other areas of industrial arts, 22.2 per cent taught mechanical drawing. One of the teachers reported that he taught one section of electricity-electronics, while two other teachers revealed that they taught sections of power mechanics.

Table V contains data concerning the objectives of the teachers involved in the study. These data disclosed that

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Number of Teachers</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Develop Qualities of Craftsmanship</td>
<td>67</td>
<td>93</td>
</tr>
<tr>
<td>Provide Technical Information for Career Seekers</td>
<td>49</td>
<td>68</td>
</tr>
<tr>
<td>Instruct Complicated Machine Setups and Operations</td>
<td>44</td>
<td>61.1</td>
</tr>
<tr>
<td>Provide Technical Information, Safety Precaution, Machine</td>
<td>70</td>
<td>97.2</td>
</tr>
<tr>
<td>Maintenance, Tool Experience and Operation Procedures</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provide Information on Woodworking Industry, Purchasing, Storing</td>
<td>43</td>
<td>69.7</td>
</tr>
<tr>
<td>Provide Information on Custom and Production Finishing Techniques</td>
<td>42</td>
<td>58.3</td>
</tr>
<tr>
<td>Provide for Research and Evaluation of Workmanship</td>
<td>30</td>
<td>41.6</td>
</tr>
</tbody>
</table>
fourteen, or 18.1 per cent, of the teachers indicated that their objectives paralleled all of the objectives as set forth by the Texas Education Agency in the monograph entitled Woodworking, Grades 7-12 prepared by the Texas Industrial Arts Association. Seventy, or 97.2 per cent, of the teachers indicated that to provide technical information, safety precaution, machine maintenance, tool experience, and operation procedure were commonly recognized as being parallel to their objectives. Table V also indicated that sixty-seven teachers, or 93.0 per cent, tried to develop qualities of craftsmanship in their students. Forty-nine teachers, or 68.0 per cent, indicated that they strove to provide technical information for career-seeking students. Providing for research and evaluation of workmanship was recognized as the least important by thirty teachers.

Table VI contains data concerning the prerequisites required by the teachers under consideration. Twenty-six of them required general woodworking before machine woodworking I. Further analysis revealed that fifty-nine of them required machine woodworking I before machine woodworking II, while ten of them required no prerequisite for any of their woodworking sections.

Table VII contains data concerning the use of the power woodworking machinery. According to these data, 76.3 per cent of the teachers have their students using all of the machines, as listed in Table VII.

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Texas Education Agency, Woodworking, Grades 7-12 (Austin, Texas, 1965).
### Table VI

**SCHOOL REQUIRED PREREQUISITES FOR MACHINE WOODWORKING I AND II**

<table>
<thead>
<tr>
<th>Prerequisite</th>
<th>Number of Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Woodworking before Machine Woodworking I</td>
<td></td>
</tr>
<tr>
<td>Machine Woodworking I before Machine Woodworking II</td>
<td>26</td>
</tr>
<tr>
<td>Machine Woodworking I before Machine Woodworking II</td>
<td>59</td>
</tr>
<tr>
<td>No Prerequisite for any Woodworking</td>
<td>10</td>
</tr>
</tbody>
</table>

As shown in Table VII, all of the teachers had their students using the band saw, with seventy, or 97.2 per cent, using the jointer. Fewer students used the scroll saw as indicated by sixty-one, or 84.7 per cent, of the teachers included in the study.

### Table VII

**POWER WOODWORKING TOOLS USED BY STUDENTS IN MACHINE WOODWORKING I AND II**

<table>
<thead>
<tr>
<th>Machines</th>
<th>Number of Teachers</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Saws</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scroll (Jig)</td>
<td>61</td>
<td>84.7</td>
</tr>
<tr>
<td>Circular</td>
<td>69</td>
<td>95.8</td>
</tr>
<tr>
<td>Band</td>
<td>72</td>
<td>100.0</td>
</tr>
<tr>
<td>Jointer</td>
<td>70</td>
<td>97.2</td>
</tr>
<tr>
<td>Planer</td>
<td>69</td>
<td>95.8</td>
</tr>
<tr>
<td>Electric Hand Drill</td>
<td>69</td>
<td>95.8</td>
</tr>
<tr>
<td>Drill Press</td>
<td>70</td>
<td>97.2</td>
</tr>
<tr>
<td>Sanders</td>
<td>70</td>
<td>97.2</td>
</tr>
<tr>
<td>Wood Turning Lathe</td>
<td>70</td>
<td>97.2</td>
</tr>
<tr>
<td>Router</td>
<td>67</td>
<td>94.8</td>
</tr>
</tbody>
</table>
Table VIII contains data concerning the use, care and maintenance of hand tools. According to these data, fifty-three of the teachers instructed their students in the use, care, and maintenance of all hand tools listed in the table.

TABLE VIII

INSTRUCTION IN THE USE, CARE, AND MAINTENANCE OF HAND TOOLS
BY MACHINE WOODWORKING TEACHERS

<table>
<thead>
<tr>
<th>Hand Tools</th>
<th>Number of Teachers</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saws</td>
<td>62</td>
<td>86.1</td>
</tr>
<tr>
<td>Planes</td>
<td>67</td>
<td>93.0</td>
</tr>
<tr>
<td>Chisels</td>
<td>66</td>
<td>91.6</td>
</tr>
<tr>
<td>Boring and Drilling Tools</td>
<td>61</td>
<td>84.7</td>
</tr>
<tr>
<td>Measuring and Layout Tools</td>
<td>63</td>
<td>87.5</td>
</tr>
</tbody>
</table>

The most commonly used tool was the hand plane. This was indicated by 93.0 per cent of the teachers. Boring and drilling tools were used by sixty-one, or 84.7 per cent of the teachers.

The teachers of machine woodworking I and II were asked if they required their students to be able to read and understand a working drawing. The majority, sixty-five, or 90.2 per cent, felt they had to teach their students to be able to read and understand a working drawing. The minority, four, or 5.5 per cent, felt the student need not be familiar with a working drawing.

Additional investigation of the questionnaire disclosed that the teachers, as a whole, required their student to be
able to measure lumber. The majority, seventy, or 97.2 per cent, indicated that they teach their students to measure lumber.

Table IX contains data concerning the common construction wood joints that the teachers required their students to be able to design and construct for project use. Thirty-eight required their students to know all the wood joints listed in Table IX.

**TABLE IX**

**COMMON WOODWORKING JOINTS USED BY STUDENTS IN PROJECT CONSTRUCTION IN MACHINE WOODWORKING I AND II**

<table>
<thead>
<tr>
<th>Joints</th>
<th>Number of Teachers</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rabbet</td>
<td>68</td>
<td>94.7</td>
</tr>
<tr>
<td>Dado</td>
<td>68</td>
<td>94.7</td>
</tr>
<tr>
<td>Miter</td>
<td>68</td>
<td>94.7</td>
</tr>
<tr>
<td>Lap</td>
<td>55</td>
<td>76.3</td>
</tr>
<tr>
<td>Mortise and Tenon</td>
<td>46</td>
<td>63.8</td>
</tr>
</tbody>
</table>

Further breakdown of Table IX revealed that the rabbet, dado, and miter joint all received 94.7 per cent support from the teachers. The data also revealed that the mortise and tenon joint was used by students in 63.8 per cent of the classes.

Table X contains data concerning the emphasis placed on the elements of design in planning a project. The teachers indicated that a project must be thoroughly planned before a student can begin any steps of construction.
TABLE X

ELEMENTS OF DESIGN EMPHASIZED IN PLANNING OF PROJECTS BY STUDENTS IN MACHINE WOODWORKING I AND II

<table>
<thead>
<tr>
<th>Elements</th>
<th>Number of Teachers</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balance</td>
<td>54</td>
<td>75.9</td>
</tr>
<tr>
<td>Unity proportion</td>
<td>37</td>
<td>50.1</td>
</tr>
<tr>
<td>Repetition of Rhythm</td>
<td>60</td>
<td>83.3</td>
</tr>
<tr>
<td>Function</td>
<td>17</td>
<td>23.6</td>
</tr>
<tr>
<td></td>
<td>64</td>
<td>88.8</td>
</tr>
</tbody>
</table>

As shown in Table X, it is indicated that function, with 88.8 per cent, had the highest percentage of interest among the teachers. Repetition of rhythm was used by fewer, 23.6 per cent, of them. The data in Table X also revealed that one teacher indicated that he did not teach his students any of the elements of design mentioned.

Table XI contains data concerning the factors that teachers have indicated as being important and should be considered by students when they are planning their projects. As noted, sixteen of the teachers taught all of the factors mentioned.

Need of the project and estimated cost both received 91.6 per cent of the teacher's attention. Table XI also reveals that sixty-four, or 88.8 per cent, of the teachers indicated that the capability of the student should be considered before he begins planning his projects.
TABLE XI
FACTORS GIVEN CONSIDERATION IN PLANNING PROJECTS FOR MACHINE WOODWORKING I AND II

<table>
<thead>
<tr>
<th>Considerations</th>
<th>Number of Teachers</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Need</td>
<td>66</td>
<td>91.6</td>
</tr>
<tr>
<td>Estimated Cost</td>
<td>66</td>
<td>91.6</td>
</tr>
<tr>
<td>Compatibility</td>
<td>30</td>
<td>41.6</td>
</tr>
<tr>
<td>New Experience Demand</td>
<td>41</td>
<td>56.8</td>
</tr>
<tr>
<td>Capability of Student</td>
<td>64</td>
<td>88.8</td>
</tr>
<tr>
<td>Collection of Ideas</td>
<td>38</td>
<td>52.7</td>
</tr>
<tr>
<td>Selection of Best Ideas</td>
<td>52</td>
<td>72.2</td>
</tr>
<tr>
<td>Development of Ideas</td>
<td>54</td>
<td>75.0</td>
</tr>
</tbody>
</table>

Table XII presents data concerning the factors involved in selection of materials. Twenty-seven, or 37.5 per cent, of the teachers taught all the factors listed.

TABLE XII
FACTORS USED IN THE SELECTION OF MATERIALS WHEN PLANNING PROJECTS FOR MACHINE WOODWORKING I AND II

<table>
<thead>
<tr>
<th>Factors</th>
<th>Number of Teachers</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adaptability</td>
<td>48</td>
<td>66.6</td>
</tr>
<tr>
<td>Durability</td>
<td>54</td>
<td>75.0</td>
</tr>
<tr>
<td>Availability</td>
<td>55</td>
<td>76.3</td>
</tr>
<tr>
<td>Workability</td>
<td>61</td>
<td>84.7</td>
</tr>
</tbody>
</table>
Sixty-one, or 84.7 per cent, of the teachers felt that workability was the most important factor concerning the selection of materials. Adaptability, with forty-eight teachers, or 66.6 per cent, was the last choice. Additional separation of the data revealed that the number of teachers ranged from forty-eight to sixty-one, indicating that all the factors in Table XII are included in the instructor's course of study.

Table XIII presents data concerning the performances that students follow when completing their project planning. Forty-five, or 62.5 per cent, of the teachers taught their students all of the project planning procedures that were mentioned in the table.

**TABLE XIII**

*PROJECT PLANNING PERFORMANCES TAUGHT BY TEACHERS OF MACHINE WOODWORKING I AND II*

<table>
<thead>
<tr>
<th>Performances</th>
<th>Number of Teachers</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development of Drawing or Illustration</td>
<td>67</td>
<td>93.0</td>
</tr>
<tr>
<td>List of Materials</td>
<td>60</td>
<td>83.3</td>
</tr>
<tr>
<td>Working Procedure</td>
<td>50</td>
<td>69.4</td>
</tr>
</tbody>
</table>
A majority of the teachers, sixty-seven, or 93.0 per cent, felt that the development of drawings or illustrations were of prime importance in project planning. The working procedure was of least importance, according to the data obtained from the woodworking teachers in Texas.

Table XIV presents data concerning the number of machine jigs and fixtures that were being used by the students in the machine woodworking I and II classes. The data revealed that four teachers taught their students the use of all mentioned machine jigs and fixtures, while one instructor reported the use of no machine jigs or fixtures in his classes.

TABLE XIV

MACHINE JIGS AND FIXTURES USED BY STUDENTS IN MACHINE WOODWORKING I AND II

<table>
<thead>
<tr>
<th>Jig or Fixture</th>
<th>Number of Teachers</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radial Arm Saw</td>
<td>33</td>
<td>45.8</td>
</tr>
<tr>
<td>Circular Saw</td>
<td>59</td>
<td>81.9</td>
</tr>
<tr>
<td>Jointer</td>
<td>24</td>
<td>33.3</td>
</tr>
<tr>
<td>Band Saw</td>
<td>43</td>
<td>59.7</td>
</tr>
<tr>
<td>Lathe</td>
<td>24</td>
<td>33.3</td>
</tr>
<tr>
<td>Shaper</td>
<td>23</td>
<td>31.9</td>
</tr>
<tr>
<td>Hollow Chisel Mortiser</td>
<td>19</td>
<td>26.3</td>
</tr>
<tr>
<td>Drill Press</td>
<td>52</td>
<td>72.2</td>
</tr>
</tbody>
</table>
The students in machine woodworking I and II used jigs and fixtures on the circular saw more than any other piece of machinery in the machine woodworking laboratory. The least used machine jig or fixture was the hollow chisel mortiser, as indicated by nineteen, or 26.3 per cent, of the teachers.

Table XV presents data concerning the safe and effective use of power machines. The data revealed that twenty-six, or 36.1 per cent, of the teachers instructed their students in the safety and effective use on all of the machines mentioned.

**TABLE XV**

POWER MACHINES USED BY STUDENTS IN MACHINE WOODWORKING I AND II

<table>
<thead>
<tr>
<th>Machines</th>
<th>Number of Teachers</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circular Saw</td>
<td>66</td>
<td>91.6</td>
</tr>
<tr>
<td>Jointer</td>
<td>66</td>
<td>91.6</td>
</tr>
<tr>
<td>Shaper</td>
<td>39</td>
<td>54.1</td>
</tr>
<tr>
<td>Surfacer</td>
<td>67</td>
<td>93.0</td>
</tr>
<tr>
<td>Drill Press</td>
<td>69</td>
<td>95.8</td>
</tr>
<tr>
<td>Jig Saw</td>
<td>59</td>
<td>81.9</td>
</tr>
<tr>
<td>Band Saw</td>
<td>68</td>
<td>94.4</td>
</tr>
<tr>
<td>Disk and Belt Sander</td>
<td>60</td>
<td>83.3</td>
</tr>
<tr>
<td>Wood Turning Lathe</td>
<td>66</td>
<td>91.6</td>
</tr>
</tbody>
</table>
A closer look at the data in Table XV revealed that sixty-nine, or 95.8 per cent, of the teachers instructed their students in the safe and effective use of the drill press. All of the machines listed in the table were in the ninety per cent range, with the exception of the shaper with thirty-nine, or 54.1 per cent, and the jig saw, which received fifty-nine, or 81.9 per cent, of the support of the teachers.

Table XVI contains data concerning the portable electric power tools. Sixty-seven, or 93.0 per cent of the teachers instructed their students on the safe procedures of portable power tools. Safety instruction included such things as ground wires and connections, clamping devices for holding materials, and correct operational procedures.

### Table XVI

The number of teachers instructing students in the use of portable power tools

<table>
<thead>
<tr>
<th>Portable Power Tools</th>
<th>Number of Teachers</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portable Electric Hand Drill</td>
<td>62</td>
<td>86.1</td>
</tr>
<tr>
<td>Portable Electric Saw</td>
<td>54</td>
<td>75.0</td>
</tr>
<tr>
<td>Portable Electric Hand Saw</td>
<td>23</td>
<td>31.9</td>
</tr>
<tr>
<td>Portable Electric Router</td>
<td>62</td>
<td>86.1</td>
</tr>
<tr>
<td>Portable Electric Belt, Disk Sanders, and Orbital Sanders</td>
<td>62</td>
<td>86.1</td>
</tr>
</tbody>
</table>
The portable electric hand drill, the portable electric router, and the portable electric belt, disk sanders, and orbital sanders all received support by sixty-two, or 86.1 per cent, of the teachers. Twenty-three, or 31.9 per cent, indicated that they generally did not instruct their students on the use of portable electric hand saw. The portable electric saw received fifty-four, or 75.0 per cent, indicating that most teachers were giving their students instruction in that area.

The teachers were asked if they instructed their students in the general purposes and classifications of abrasives. The majority, sixty-two, or 86.1 per cent, said that they did instruct their students on the general purposes and classifications of abrasives. The remaining seven teachers disclosed that they did not.

Table XVII contains data concerning the kinds of abrasives used by the students. Forty-nine of the teachers instructed

<table>
<thead>
<tr>
<th>TABLE XVII</th>
</tr>
</thead>
<tbody>
<tr>
<td>THE KIND OF ABRASIVES USED BY STUDENTS OF MACHINE WOODWORKING I AND II</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Abrasives</th>
<th>Number of Teachers</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rottenstone</td>
<td>42</td>
<td>58.3</td>
</tr>
<tr>
<td>Pumice</td>
<td>49</td>
<td>66.0</td>
</tr>
<tr>
<td>Tripoli</td>
<td>4</td>
<td>5.5</td>
</tr>
<tr>
<td>Diatomaceous Silica</td>
<td>7</td>
<td>9.7</td>
</tr>
</tbody>
</table>
their students in the use of pumice. Rottenstone, with forty-two, or 58.3 per cent, was the woodworking teachers' second choice. Tripoli was the lowest choice, with four teachers, or 5.5 per cent, responding.

The data showed that sixty, or 83.3 per cent, of the teachers instructed their students in the use of steel wool as an abrasive. The remaining eight did not use steel wool in their curriculum content.

Results from the questionnaires also revealed that seventy, or 97.2 per cent, of the teachers felt that the students must know how to prepare wood surfaces with sandpaper abrasives. The remaining two did not respond on this item on the questionnaire.

Table XVIII contains data concerning finishing materials and procedures that are recommended for student use by the

**TABLE XVIII**

FINISHING MATERIALS AND PROCEDURES USED BY STUDENTS IN MACHINE WOODWORKING I AND II

<table>
<thead>
<tr>
<th>Materials and Procedures</th>
<th>Number of Teachers</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stains and Staining</td>
<td>69</td>
<td>95.8</td>
</tr>
<tr>
<td>Fillers</td>
<td>66</td>
<td>94.4</td>
</tr>
<tr>
<td>Varnishes</td>
<td>53</td>
<td>73.6</td>
</tr>
<tr>
<td>Shellac</td>
<td>32</td>
<td>44.4</td>
</tr>
<tr>
<td>Lacquers</td>
<td>62</td>
<td>86.1</td>
</tr>
<tr>
<td>Bleaching</td>
<td>16</td>
<td>22.2</td>
</tr>
<tr>
<td>Paints</td>
<td>41</td>
<td>56.8</td>
</tr>
<tr>
<td>Enamels</td>
<td>32</td>
<td>44.4</td>
</tr>
<tr>
<td>Abrasive Flours</td>
<td>18</td>
<td>25.0</td>
</tr>
<tr>
<td>Polishes and Waxes</td>
<td>60</td>
<td>83.3</td>
</tr>
<tr>
<td>Paint and Varnish Remover</td>
<td>45</td>
<td>62.5</td>
</tr>
</tbody>
</table>
Texas Education Agency. It has already been shown that sixty-five, or 90.2 per cent, of the teachers felt that students should know the purposes of finishing materials. The data obtained from the questionnaire also disclosed that sixty-seven, or 93.0 per cent, of the teachers felt that they were obligated to teach their students the different methods of preparation of surface preparatory to finishing. The remaining two teachers who responded to the questionnaire did not feel that the student needed instruction in that area.

According to Table XVIII, 95.8 per cent of the teachers taught about stains and the procedures used in applying stains. The smallest percentage, 22.2 per cent, indicated that the instructors rarely taught the bleaching method. Additional analysis of Table XVIII revealed that two of the teachers instructed their students on all the listed materials and procedures.

Table XIX contains data concerning the proper use of some of the related finishing materials. According to the data, four of the teachers indicated that they instructed their students in all of the related materials in Table XIX.

Sixty-two, or 86.1 per cent, of the teachers gave their students instruction in the proper care and use of paint brushes. The data also revealed that four, or 5.5 per cent, of the teachers gave instruction in the care and use of paint rollers. One indicated that he does not instruct in any of the related materials listed in Table XIX.
TABLE XIX
FINISHING EQUIPMENT ON WHICH INSTRUCTION IN USE IS COVERED
BY MACHINE WOODWORKING TEACHERS

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Number of Teachers</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paint Brushes</td>
<td>62</td>
<td>86.1</td>
</tr>
<tr>
<td>Paint Rollers</td>
<td>4</td>
<td>5.5</td>
</tr>
<tr>
<td>Spray Equipment</td>
<td>50</td>
<td>69.4</td>
</tr>
</tbody>
</table>

The teachers were asked if they cover furniture refinishing in their course of study. Of the teachers who responded, thirty-eight, or 52.7 per cent, did instruct their students on the many phases of furniture refinishing. One of the respondents reported that he did not cover furniture refinishing in his yearly course of study.

The teachers have indicated that sixty, or 83.3 per cent, gave instruction on the general safety of the finishing room. The remaining three teachers indicated that they did not teach this phase.

Table XX contains data concerning the available finishing equipment and supplies in the industrial arts finishing rooms. Sixty-eight, or 94.4 per cent, of the teachers have staining material in their finishing rooms. Fillers and lacquers, both with sixty-three, or 87.5 per cent, were the next most popular...
materials in the average finishing room. Sixteen, or 22.2 per cent, of the teachers indicated that bleach and glaze were not included in the average finishing room materials.

**TABLE XX**

FINISHING EQUIPMENT AND SUPPLIES AVAILABLE FOR STUDENT USE IN WOODWORKING I AND II

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Number of Teachers</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spray Booth or Room</td>
<td>52</td>
<td>72.2</td>
</tr>
<tr>
<td>Drying Room</td>
<td>19</td>
<td>26.3</td>
</tr>
<tr>
<td>Abrasives</td>
<td>63</td>
<td>87.5</td>
</tr>
<tr>
<td>Bleach</td>
<td>16</td>
<td>22.2</td>
</tr>
<tr>
<td>Wood Doughs</td>
<td>53</td>
<td>73.6</td>
</tr>
<tr>
<td>Stick Shellac</td>
<td>20</td>
<td>27.5</td>
</tr>
<tr>
<td>Stains</td>
<td>68</td>
<td>94.4</td>
</tr>
<tr>
<td>Sealers</td>
<td>61</td>
<td>84.7</td>
</tr>
<tr>
<td>Lacquers</td>
<td>65</td>
<td>90.2</td>
</tr>
<tr>
<td>Fillers</td>
<td>16</td>
<td>22.2</td>
</tr>
<tr>
<td>Glaze</td>
<td>64</td>
<td>88.8</td>
</tr>
<tr>
<td>Solvents and Thinners</td>
<td>42</td>
<td>57.1</td>
</tr>
<tr>
<td>Metal Storage for Materials</td>
<td>35</td>
<td>47.1</td>
</tr>
<tr>
<td>Covered Metal Waste Container</td>
<td>41</td>
<td>50.8</td>
</tr>
</tbody>
</table>

Table XXI contains data concerning finishing attainments which were recommended by the Texas Education Agency. Seventy-one, or 99.1 per cent, of the teachers indicated that development of pride of workmanship was the most important finishing attainment. The actual preparation of the different finishes with fifty-two, or 72.2 per cent, was the lowest percentage indicated. Deeper investigation of the data of Table XXI revealed that forty-five, or 62.5 per cent, of the teachers felt that they favored all of the listed finishing attainments.
TABLE XXI
FINISHING OBJECTIVES FOR MACHINE WOODWORKING I AND II

<table>
<thead>
<tr>
<th>Attainments</th>
<th>Number of Teachers</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appreciation of Fine Furniture Finishes</td>
<td>64</td>
<td>88.8</td>
</tr>
<tr>
<td>Development of Pride of Workmanship</td>
<td>71</td>
<td>99.1</td>
</tr>
<tr>
<td>Preparation of Different Finishes</td>
<td>52</td>
<td>72.2</td>
</tr>
<tr>
<td>Preparation and Application of Fillers</td>
<td>64</td>
<td>88.8</td>
</tr>
<tr>
<td>Preparation and Application of Stains</td>
<td>68</td>
<td>94.1</td>
</tr>
<tr>
<td>Knowledge of Several Types of Finishes</td>
<td>58</td>
<td>80.4</td>
</tr>
<tr>
<td>Cleaning and Caring for Finishing Equipment</td>
<td>69</td>
<td>95.8</td>
</tr>
</tbody>
</table>

Additional data obtained from the questionnaires revealed that thirty-four, or 47.2 per cent, of the teachers were striving to enhance the experiences of the student in areas which are impractical to be experienced first-hand in the home or laboratory. Twenty-seven, or 37.5 per cent, of the teachers indicated that this was not one of their objectives.

Data obtained from the questionnaire revealed that thirty-nine, or 54.1 per cent, of the teachers felt that machine woodworking, with two years prerequisite in woodworking, should be designed specifically to meet the needs of the community. The questionnaire also revealed that twenty-eight, or 38.8 per cent, of the teachers did not feel that machine woodworking should be designed to meet the needs of the community.
The teachers were asked if they would like to receive a summary of this study. Of the seventy-two teachers, fifty-four, or 75.0 percent, replied that they would like to have such a summary, while eighteen, or 25.0 percent, indicated that they did not care to have a copy. These data indicated that the teachers involved in this study were interested in a study of this type.
CHAPTER IV

AN ANALYSIS OF PRESENT COURSE OFFERINGS WITH EMPHASIS ON VARIATIONS FROM THE PRESCRIBED COURSE OFFERINGS FOR MACHINE WOODWORKING I AND II

Chapter IV is devoted to an analysis of the present course offerings in machine woodworking I and II in the high schools in the state of Texas. Special emphasis is placed on the variations from the prescribed course offerings as set up by the Texas Education Agency.

Machine woodworking I, as indicated in the monograph, is designed to include eight major sections of study. The first section of study is a review of general woodworking. The second section is concerned with design of projects. The third section deals mainly with project planning. The fourth section pertains to the power woodworking machinery in the industrial arts machine woodworking I and II laboratories. The sixth section includes the portable electric power tools. The seventh section includes the use of abrasives. The eighth and final section is devoted to the finishing of projects.

The first section of study, a review of general wood work, includes such aspects as the following: (1) reading and understanding a working drawing; (2) design of a project; (3) project planning; (4) purchasing and measuring lumber; (5) use and care
of power tools; (6) use, care, and maintenance of hand tools; (7) types of common wood joints; (8) shop safety and organization; (9) fasteners and hardware; (10) abrasives used in woodwork; (11) finishing materials and processes; (12) gluing and clamping; and (13) related information. The above areas are all included in the questionnaire which was mailed to the ninety-eight high school industrial arts teachers in the state of Texas.

The second section is mainly concerned with design. This area includes creative planning, kinds of design, principles of design and the related information which pertains to the design of projects.

Section three deals with project planning. Project planning covers the following: (1) selection of project, (2) selection of materials, (3) planning, and (4) selection of finish.

The fourth section emphasizes the use of machine jigs and fixtures used by the industrial arts machine woodworking I students. Machine jigs and fixtures includes the following: (1) jigs and fixtures, (2) templates, (3) design of a jig, (4) types of jigs and fixtures pertaining to the woodworking industry, and (5) jigs and fixtures for the machines in the machine woodworking I and II shops.

The fifth section pertains to the power woodworking machines in the woodworking laboratory. This section of instruction contains two separate parts for the student:
(1) things the student should be able to do when using the power woodworking machines, and (2) things the student should know about power woodworking machinery.

The sixth section is concerned with the portable electric power tools. Included here is safety instruction in the use of portable power tools and the care and use of portable electric power tools in the machine woodworking shop. This classification involves the portable electric hand drills, the portable electric saw, the portable electric hand saw, the portable electric router, and the portable electric belt, disk and orbital sanders.

The seventh section is concerned with the abrasives used in the machine woodworking classes. This section contains the following: (1) purposes of abrasives, (2) classification of abrasives, (3) coated abrasives, (4) abrasive flours, and (5) steel wools.

The eighth and final section of machine woodworking I includes the finishing or projects, (2) preparation of surfaces, (3) stains and staining, (4) fillers, (5) varnishes, (6) shellac, (7) bleaching, (8) abrasive flours, (9) polishes and waxes, (10) paints, (11) enamel, (12) paint brushes and rollers, (13) spray equipment, (14) paint and varnish removers, (15) furniture refinishing, and (16) general safety of the finishing room. Section eight also includes suggested materials for the finishing room.

Machine woodworking II, with machine woodworking I as a prerequisite, is a follow-up of machine woodworking I. The
students are expected to be able to produce a high degree of
skill and craftsmanship in millwork and furniture construction.
In machine woodworking II, the students are expected to spend
extended periods of time working on complicated machine setups
and operations. Machine woodworking II teachers are expected
to design their course specifically to meet the various needs
of the community.

Specialization is highly encouraged among the students in
machine woodworking II. Specialization areas includes carpen-
try, fabrication, experimentation, finishing, and refinishing.

According to this study, the seventy-two teachers main-
tained basically the same objectives as those mentioned by
the Agency. The teachers of machine woodworking I and II in-
dicated that they were not completely providing for research
and evaluation of workmanship as an objective.

The data obtained from teachers showed that they were in-
structing their students in the proper use of power woodworking
tools as well as the necessary hand tools. The instructors also
had their students use the most commonly used wood joints in
project construction.

The teachers were instructing in the elements of design
to some extent; however, they were not putting proper emphasis
on repetition of rhythm. Project planning, selection of ma-
terials, and project planning performances were all included
in the teacher's course of study.
The study revealed that the average teacher instructed his students in the different machine jigs and fixtures for all the most commonly used power machines. It was found in the study that the majority of instructors with access to the hollow chisel mortiser were not attempting to teach the use of jigs and fixtures available for such a machine.

Finishing materials and finishing equipment was indicated as an area of comprehensive coverage by all the seventy-two teachers. A few of the teachers indicated that they did not, however, give instruction in the bleaching of projects. The average industrial arts woodworking teacher emphasized the many finishing attainments that can be achieved through learning the proper methods and procedures.

Approximately one-half of the teachers strived to enhance the experiences of their students in areas that were impractical to be experienced first-hand in the home or school shop, and one-half of the teachers felt that machine woodworking II, with two years' prerequisite woodworking, should be designed specifically to meet the needs of the community.
CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The purposes of this study were threefold: (1) to determine the curriculum offerings in machine woodworking I and II in the high schools of Texas during the 1968-1969 school year, (2) to determine whether the curriculum offerings of the machine woodworking I and II classes agreed with the predescribed curriculum content as set up by the Texas Education Agency in a monograph entitled Woodworking, Grades 7-12, prepared by the Texas Industrial Arts Association, and (3) to determine in what ways, if any, these curriculum offerings differed from the prescribed offerings.

The study was limited to only the ninety-six accredited high schools in Texas which offer both machine woodworking I and II. The monograph entitled Industrial Arts: in Texas 1966-1967 was used to obtain the names of the ninety-eight teachers who taught both machine woodworking I and II. Questionnaires were sent to these ninety-eight teachers and returns received from seventy-two.

---

1. Texas Education Agency, Woodworking, Grades 7-12 (Austin, Texas, 1965)
Six previous studies were found to be related to this study. In 1967 Billy M. Moore made a study involving the general qualifications and status of industrial arts teachers. Joe H. Farmer made a study in 1939 concerning the colleges of Texas and their preparation of industrial arts secondary school teachers. Another study was made by Carroll B. Pippin in 1949 to determine whether the vocational education and the industrial arts program of the Orange Public Schools is meeting the needs of the community. David R. Enderby's study in 1950 pertained to whether the industrial arts teachers in Oklahoma were receiving adequate training. Robert H. Glenn in 1954 made a study to determine the qualifications and general status of the industrial arts teachers in Arkansas. Marshall L. Schmitt and Albert L. Pelly produced a survey in 1963 of industrial arts education, with emphasis on programs, teachers, students and curriculum.

The typical industrial arts woodworking teacher in the public schools of Texas in 1969, according to the findings of this study, had from four to six years teaching experience, and had taught an average of four sections of machine woodworking daily. The typical teacher did not teach classes in any area of industrial arts other than machine woodworking I and II. He taught approximately 100 students per day, and his objectives were very similar to the predescribed objectives as outlined by the Agency. The typical school system required the industrial arts students to have completed machine woodworking I before being allowed to attempt machine woodworking II.
The Agency recommended that machine woodworking I, with general woodworking as a prerequisite, be designed to include eight sections of study for high school industrial arts student. The major eight sections of study included a review of general woodworking, project design, project planning, machine jigs and fixtures, power woodworking machinery, portable electric power tools, abrasives, and finishing procedures.

Machine woodworking II, with machine woodworking I as a prerequisite, was designed as a follow-up study. Students in machine woodworking II were expected to produce a high degree of skill and craftsmanship in millwork and furniture construction. They were also expected to spend extended lengths of time on complicated machine setups and operations. The teachers of machine woodworking II were expected to design their courses to meet the various needs of the community. Machine woodworking II teachers were expected to encourage their students to choose a major area for specialized study. The areas of specialization were carpentry, fabrication, experimentation, finishing and refinishing.

The instruction of the seventy-two teachers, according to this study, followed the pre-described course of study as set up by the Agency. The individual instruction was exceptionally similar to the pre-described course of study in the following areas: objectives, use of power machinery, hand tools, common wood project construction joints, elements of design, project planning, selection of materials, project planning performances,
machine jigs and fixtures, portable power tools, finishing materials and procedures, available finishing equipment, and finishing attainments.

Conclusions

This study indicates that the majority of the industrial arts machine woodworking I and II teachers were following the general guidelines of the state predescribed course of study for machine woodworking I and II. There were, however, a few cases where the instruction did not parallel the monograph set forth by the Texas Education Agency.

The following instructional areas were not generally receiving the teachers' full attention.

1. Not all the industrial arts teachers were striving to provide for historical research, design and planning, nor were they evaluating workmanship in products of the industries.

2. Not all teachers of machine woodworking required general woodworking as a prerequisite for machine woodworking I.

3. The industrial arts teachers were not all putting much emphasis on repetition of rhythm, when discussing elements of design.

4. The majority of instructors with access to the hollow chisel mortiser were not attempting to teach their students about the design and use of jigs and fixtures available for such a machine.

5. Some teachers did not emphasize instruction on abrasives, especially tripoli and diatomaceous silica.
6. Not all industrial arts teachers included bleaching and the use of abrasive flours in their materials and procedures list for the finishing room.

7. The teachers of industrial arts did not indicate that they were striving to enhance the experiences of the students in areas that are impractical to be experienced first-hand in the home or laboratory.

8. This study indicated that some forty-six per cent of the teachers questioned did not feel that machine woodworking II should be designed to meet the specific needs of the community.

Recommendations

The following recommendations seem to be justified in terms of the findings of this study:

1. It is recommended that industrial arts machine woodworking I and II teachers continue with the course of instruction which is now being used.

2. A specific attempt should be made by the Texas Education Agency to supervise more closely all industrial arts machine woodworking curriculum offerings throughout the state.

3. A study should be made of the other areas of industrial arts to determine whether the teachers are following the courses of study as set forth by the Texas Education Agency.
CITIES IN TEXAS THAT WERE INCLUDED IN THIS STUDY

<table>
<thead>
<tr>
<th>Alice</th>
<th>Irving</th>
</tr>
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<tbody>
<tr>
<td>Alta Loma</td>
<td>Jacksboro</td>
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<tr>
<td>Aransas Pass</td>
<td>La Marque</td>
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<td>Arlington</td>
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<td>Austin</td>
<td>League City</td>
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<td>Hereford</td>
<td>Stafford</td>
</tr>
<tr>
<td>Houston</td>
<td>Sweetwater</td>
</tr>
<tr>
<td>Hutchins</td>
<td></td>
</tr>
</tbody>
</table>
Dear Sir:

I am interested in securing data from the woodworking teachers in the high schools in Texas to be used in a thesis which I am doing at North Texas State University as part of the requirements for a Master of Science degree with a major in industrial arts. The study is concerned with the course offerings in Machine Woodworking I and II in the High Schools of Texas.

I would appreciate your assistance in securing these data by your completing the enclosed information form and returning it to me at your earliest convenience. The data will be used in a confidential and professional manner and no individual will be identified in the study.

I will be glad to provide you with a summary of the study if you would like. You may indicate by checking in the appropriate space below.

I would appreciate your returning the information form within the next few days. A self addressed stamped envelope is enclosed for your convenience.

Sincerely yours,

Michael T. Uselton

☐ I would like to have a summary of the study.

Name ____________________________

Address ____________________________

______________________________
A STUDY OF THE CURRICULUM OFFERINGS IN WOODWORKING I AND II IN THE HIGH SCHOOLS OF TEXAS

DIRECTIONS: Please supply the information requested by checking ( ) the appropriate response or by filling in the needed information in the blanks. Please answer all the questions.

I

A. Name ___________________________ School ___________________________

B. Number of years of teaching experience ___________________________

C. How many sections of woodworking I do you teach? ______

D. How many sections of woodworking II do you teach? ______

E. What is the average number of students in your classes? ___________________________

F. What other areas of industrial arts do you teach? ___________________________

II.

A. Do your school goals or any of your personal aims or objectives in industrial arts parallel any of the following aims and objectives? If so, please check.

( ) 1. To develop in each student some of the qualities of craftsmanship.

( ) 2. To provide technical information for students who seek careers in the woodworking industries.

( ) 3. To instruct students in making complicated machine setups and operations.
To provide technical information, safety precautions, machine maintenance, experiences correlated with tools, and operation procedures.

To provide information on the woodworking industry, purchasing, storing, and handling of supplies.

To provide information on custom and production finishing techniques.

To provide for research and evaluation of workmanship in products of the industries.

**B. Does your school require prerequisites for woodworking?**

1. General woodworking before woodworking I.
2. Woodworking I before Woodworking II.
3. No prerequisites for any woodworking.
4. Others (Specify)

**C. Do you require your students to be able to read or understand a working drawing?**

**YES ( )  NO ( )**

**D. Do you require your students to know how to measure lumber?**

**YES ( )  NO ( )**

**E. Indicate which of the following power tools your students use.**

1. Saws
   - A. Scroll (jig)
   - B. Circular
   - C. Band

5. Drill press
6. Sanders
7. Wood turning lathe
8. Router

2. Jointer
3. Planer
4. Electric hand drill

**F. Indicate if you instruct your students on the use, care and maintenance of the following hand tools?**

1. Saws
2. Planes
3. Chisels
4. Boring and drilling tools
5. Measuring and layout tools
G. How many of the following joints do your students use in construction of projects?

( ) 1. Rabbet ( ) 4. Lap
( ) 2. Dado ( ) 5. Mortise and tenon
( ) 3. Miter

IV.

A. Is the need of the project of primary concern in planning a project: YES( ) NO( )

B. Which of the following are emphasized in project planning?

( ) 1. Balance ( ) 4. Repetition of
( ) 2. Unity ( ) Rhythm
( ) 3. Proportion ( ) 5. Function

C. When planning a project has the student been taught certain considerations such as:

( ) 1. Need ( ) 6. Collection of ideas
( ) 2. Estimated cost ( ) 7. Selection of best ideas
( ) 3. Compatibility ( ) 8. Development of ideas
( ) 4. New experience demand
( ) 5. Capability of the student

D. Which of the following do you have your students take into consideration when selecting materials for their projects?

( ) 1. Adaptability ( ) 3. Availability
( ) 2. Durability ( ) 4. Workability

E. Which of the following performances do you have your students complete when planning their projects?

( ) 1. Development of drawing or illustrations
( ) 2. List of materials
( ) 3. Working procedure

V.

A. Do your students use jigs and fixtures on any of the following machines?

( ) 1. Radial arm saw
B. Do your students know how to use the following power machines effectively and safely?

( ) 1. Circular saw  ( ) 6. Jig saw
( ) 2. Jointer  ( ) 7. Band saw
( ) 3. Shaper  ( ) 8. Disk and belt sander
( ) 4. Surfacer  ( ) 9. Wood turning lathe
( ) 5. Drill press

VI.

A. Do you give your students safety instruction on portable power tools involving such things as ground wires and connections, clamping devices for holding materials, and correct operational procedures? YES( ) NO( )

B. Do you instruct your students in the use of the following portable electric power tools?

( ) 1. Portable electric hand drill (1/2", 1/4", 3/8")
( ) 2. Portable electric (bayonet, sabre, jig) saw
( ) 3. Portable electric hand saw
( ) 4. Portable electric router
( ) 5. Portable electric belt, disk sanders, and orbital sanders

VII.

A. Are your students instructed in the general purposes and classifications of abrasives? YES( ) NO( )

Which of the following abrasives are used by your students?

( ) 1. Rottenstone  ( ) 3. Tripoli
( ) 2. Pumice  ( ) 4. Diatomaceous silica

B. Do your students use steel wool? YES( ) NO( )

C. Do your students know how to prepare wood surfaces with sand paper abrasives? YES( ) NO( )
VIII.

A. Do you instruct your students in the purposes of finishing materials? YES( ) NO( )

B. Are your students familiar with the different methods of preparation of surfaces preparatory to finishing? YES( ) NO( )

C. Which of the following finishing materials and procedures do your students use?

   ( ) 1. Stains and staining ( ) 2. Fillers ( ) 3. Varnishes ( ) 4. Shellac ( ) 5. Lacquers ( ) 6. Bleaching

D. Do you instruct your students in the proper use of the following:

   ( ) 1. Paint brushes ( ) 2. Paint Rollers ( ) 3. Spray equipment ( ) 4. Paint and varnish removers
   ( ) 5. Furniture refinishing

E. Do you instruct your students on the general safety of the finishing room? YES( ) NO( )

F. Do you strive to teach your students certain attainments as mentioned below?

   ( ) 1. Appreciation of fine furniture finishes ( ) 2. Development of pride of workmanship
   ( ) 3. Preparation of different types of finishes ( ) 4. Preparation and application of fillers
   ( ) 5. Preparation and application of stains ( ) 6. Knowledge of several types of finishes
   ( ) 7. Cleaning and care for finishing materials and equipment

G. Which of the following are available for student use?

   ( ) 1. Spray booth or room
   ( ) 2. Drying room
   ( ) 3. Abrasives
   ( ) 4. Bleach
   ( ) 5. Wood doughs
H. Do you strive to enhance the experience of the student in areas that are impractical to be experimented first-hand in the home or laboratory? YES( ) NO( )

IX.

A. Do you as an instructor feel that machine woodworking with two years' prerequisite woodworking should be designed specifically to meet the needs of the community? YES( ) NO( )
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