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# Development of Measurement Instruments for Testing Minimum Competency for the Woods Technology I Curriculums in the State of Virginia

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# DEVELOPMENT OF MEASUREMENT INSTRUMENTS FOR TESTING MINIMUM COMPETENCY FOR THE WOODS TECHNOLOGY I CURRICULUMS IN THE STATE OF VIRGINIA

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by
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# CHAPTER I

## INTRODUCTION

The Virginia General Assembly, as mandated by the Constitution of Virginia, has enacted legislation which establishes the "Standards of Quality for Virginia Public Schools." In its legislative session for the 1978-1980 biennium, the Legislature approved legislation that requires the local school divisions to establish minimum competencies for their students. The State Board of Education, in conjunction with this legislation, has encouraged the implementation of competency based instruction as a means of improving education. In addition, Vocational Education in Virginia has established a commitment to full implementation of competency based instruction by June 30, 1982. Industrial Arts, being a part of Vocational Education, has established a similar commitment to implementation of competency based instruction.

Industrial Arts Education, at the state level, in the summer of 1977, introduced the Industrial Arts Curriculum K-12 Model Plan to educators throughout Virginia. The plan outlined the preferred courses, course sequence and purposes which should be addressed in all Industrial Arts programs, but it did not establish minimum competencies which students should possess when they complete the courses of instruction. Virginia Industrial Arts Educators, with the cooperation and funding assistance of the State Board of Education, in 1979, developed Industrial Arts Competency Catalogs for all program areas within the Industrial Arts curriculum. These catalogs are scheduled for implementation by June 30, 1982.

## STATEMENT OF THE PROBLEM

The Virginia General Assembly, in revising the Standards of Quality for Virginia Public Schools, during the 1978-1980 biennium, mandated that minimum competencies be developed

both needed goods and personnel.

World War II not only produced a need for additional goods and trained personnel, but it also produced a population explosion in the United States. The children born during this period of time created new demands in the 1960's for educators. A need developed for these people to be educated in the Cognitive, Psycomotor and Affective domains of learning. To meet these new demands educators turned to individualized instruction as a teaching technique. In order to individualize instruction a careful analysis of existing programs had to be performed, and specific behavioral objectives had to be developed. The instruction had to follow in a logical sequence and the development of this learning sequence became known as programmed instruction. Programmed instruction helped relieve the large personnel requirements of individualized instruction by enabling the student to learn and progress at his own pace. Individualized programmed instruction became an important part of competency based education.

After the development of individualized instruction other problems developed in education. Through the years students became dissatisfied with schools and stressed a need for more relevancy in school curriculum. The providing of additional funds to the states and localaties by the federal government helped eliminate many of the problems and criticisms expressed.

As federal funds became more readily available and states took advantage of them, accountability became an important part of education. New innovative approaches were developed and piloted. In its 1978-1980 Biennium, The Virginia General Assembly legislated "The Standards of Quality for Virginia Public Schools" which specified that all students would develop basic competencies in learning skills.

## LIMITATIONS OF THE STUDY

The study was limited to the following:

1. The Commonwealth of Virginia Industrial Arts Curriculum for Woods Technology I

2. Only the tasks set forth in the Industrial Arts Education Competency Catalogue

## ASSUMPTIONS

The following are statements that were assumed to be correct before conducting this research:

1. The tasks set forth in the competency catalog were assumed to be correct and in line with the state industrial arts curriculum.
2. The developed evaluative instruments will only be administered to high school students grades 10-12.
3. The students being administered the instruments have the reading skill necessary to complete the instruments.

## PROCEDURES

The procedures that were followed for this stduy consisted of the following:

1. Review related literature on CBE and CBI.
2. Review Industrial Arts Woods Technology I Catalogue.
3. Review and evaluate the Industrial Arts Education Competency Catalogue.
4. Review competency tasks and criterion reference for each task.
5. Review literature related to competency based tests as related to industrial arts.
6. Review literature related to normative and criterion and reference testing procedures.
7. Develop a cognitive written evaluation for tasks or groups of tasks meeting minimum competencies.
8. Develop a project to evaluate the achievement of minimum competencies in given tasks of the psycomotor domain.
9. Develop an instrument to evaluate students' attitudes toward the programs in the effective domain.

## DEFINITION OF TERMS

The following is a list of terms related to this research study. A basic knowledge of these terms should establish an understanding of this research study.

1. Affective Domain (Attitude) is learning which involves interests, attitudes, values, and emotions of the learner (Cilley, Elson,Oliver, 1977, p. 3).

2. Area of Competence identifies the Industrial Arts course for which the particular task was prepared (Joyner and Ritz, 1978, p. iii).

3. CBI - Competency Based Instruction is a means of education based upon the identification and attainment of pre-specified, role relevant outcomes (Joyner and Ritz, 1979).

4. Cognitive Domain(Knowledge)is learning which involves recall of recognition of knowledge and the development of intellectual abilities and skills (Cilley et al., 1977, p. 3).

5. Competency Based Instructional Unit is the format which is specified by the State Department of Education, Vocational Education/Industrial Arts for stating tasks in the competency catalogs for Industrial Arts (Joyner et al., 1979).

   Area of Competency:

   Content/Concept:

   Task:

   Criterion Referenced Measure:

   Performance Guides:

6. Content/Concept identifies the sub-area for which the particular task is associated (Joyner et al., 1978, p. iii).

7. Criterion Referenced Testing is a comparison of an individual's performance with a present standard related to a specific objective (Cilley et al., 1977, p. 3).

8. Domain is a group of related occupations around which an instructional program is organized (Cilley et al., 1977, p. 3).

9. Industrial Arts Education Competency Based Catalog for Woods Technology is a publication developed by the Virginia Department of Education, Vocational Education, to establish a basis for program content selection and criterion levels from which one may measure to see if individual learners have achieved a minimal level of competence through study in a particular course.

10. LAP - Learning Activity Package is an instructional system arranged in units of effort that can be completed by students in varying lengths of time (Hird, 1979, p. 28).

11. Norm-Referenced Testing is a comparison of the performance of individuals with the performance of a group so that scores have only relative significance in terms of the specific group (Cilley et al., 1977, p. 4).

12. Open Entry/Open Exit is a feature of individualized instruction which allows a student to begin a course or program upon meeting the entrance requirements and to leave the course or program upon mastering the exit requirements (Cilley et al., 1977, p. 5).

13. Performance Guides are sub-tasks which lead to the development of the knowledge, skills and attitudes identified in the tasks (Joyner et al., 1978, p. iii).

14. Psychomotor Domain (Skills) is learning which involves manipulation of motor skills (Cilley et al., 1977, p. 3).

15. Suggested Topical Outline is an outline of suggested units of study for areas of competence. It follows the Virginia Industrial Arts Curriculum Guide of Instructional units in Woodworking I (Joyner et al., 1979).

16. Task is the knowledge, skills, or attitudes which the learner should possess after instruction in the Industrial Arts class (Joyner et al., 1978, p. iii).

17. Woods Technology I is a course of study in the Virginia Industrial Arts Curriculum in which students design, plan, and build wood products as they study the woodworking industry (Joyner et al., 1979).

## SUMMARY

Chapter I of this research study contained an introduction to the study and why it was undertaken. It included an introduction, a statement of the problem, the goals and objectives of the study, the background and significance, limitations, assumptions, and methods and procedures followed in conducting the study. Also included was a definition of terms used and finally an overview and summary of all the chapters contained in the study. In Chapter II, a review of related research and literature was reported. It included information on history, philosophy, ideas and suggestions by various authors concerning competency based education and evaluation. Chapter III contained the research methodology. In Chapter IV the findings and analysis of the data collected was reported. Chapter V contained a summary, conclusions and recommendations of the study.

# CHAPTER II
# REVIEW OF LITERATURE

Competence based education in industrial arts is a relatively new concept throughout the country and in the state of Virginia. Little research and follow-up is available in competency based education because of the relatively short period of time that it has been used in education. Most information on competency based education is in the form of research papers or journal articles.

The state of Virginia in 1979 developed competency catalogs for industrial arts, and in the fall of 1979 introduced them to industrial arts teachers throughout the state, through in-service courses. Full implimentation of competency based industrial arts is targeted for June 30, 1982.

The competency catalogs for industrial arts did not contain evaluative instruments or guidelines for evaluating students meeting the minimum stated competency tasks. There appeared to be a definite need for tests to be developed to evaluate students in a least three levels: cognitive, Psycomotor, and affective domains. In order to develop tests to effectively evaluate students in the areas of competence, a knowledge of competency based instruction was necessary. The research in this chapter gave the author a knowledge of the history, purpose, advantages, disadvantages and future of competency based instruction. Testing methods and procedures were also researched.

## COMPETENCY BASED EDUCATION

The competency based education movement has created a situation that throughout the history of education has seldom been seen. It has captured the general imagination of teachers, students and the general population who have been introduced to it. The concept has been widely accepted throughout education.

Competency based education was first applied to teacher

education for certifying teachers. It was first proposed as a developmental basis for The Comprehensive Elementary Teacher Education Models in 1968. The competency based instructional programs in teacher education have been created by the demand that educational institutions be accountable for the products which their programs produced and the continuing need to improve the effectiveness of education (Cilley, Elson and Oliver, 1977).

Competency based education next spread to the pre-college and vocational job training areas of education. It was employed to assure minimum levels of achievement for high school students. The essence of competency based education reflects the basic tenet that American society is concerned with doing, not just knowing how to do. Vocational education has probably done more in competency based education than any other disipline. Other names have been given to the movement such as: modular instruction, open education, behaviorism, criterion reference assessment, and field-based preparation. The two that have been predominantly employed are competency based education (CBE) and performance based education (PBE) (Houston and Warner, 1977). No matter what term or name given to this form of education, it is designed to give a student a specified method of learning.

Competency based education moved in a logical sequence from stresses on teacher oriented education to student oriented competency based education. The movement which got its start at the secondary level as an idea in 1975 and 1976, in the states of California, Florida, Oregon and a handful of other states, has now gained popularity in many other states. As of March 15, 1978, thirty-three states had taken some type of action to mandate the setting of minimum competency standards for elementary and secondary students. Testing of competencies at the elementary level is being mandated by legislation more and more each year (Pipho, 1978).

The state of Virginia first became directly involved in competency based education when the 1978 General Assembly en-

acted the Standards of Quality for Public Schools in Virginia. Virginia law, under the state Constitution, states that the goals of (the) public education in Virginia are to aid each pupil, consistent with his or her abilities and educational needs. It is to develop competence in the basic learning skills, and to help pupils to progress on the basis of achievement. Pupils should be able to qualify for further education or employment and develop ethical standards of behavior in order to participate in society as a responsible citizen. They should develop a positive attitude and have a realistic concept of themselves and others. Goals should be established for pupils to endeavor to enhance the beauty of the environment and practice sound habits in personal health. These mandated goals are to be used as guides for local school districts to develop programs to meet these goals.

The Industrial Arts Curriculum K-12, A Model for State and Local Planning, was a document introduced by the Virginia Industrial Arts Education Service in the summer of 1977. It was developed to serve as a basis for planning in all public school industrial arts programs in Virginia. Preferred courses, course sequences, and purposes which should be addressed in industrial arts programs were outlined in this plan. The introduction of this plan placed new requirements on industrial arts teacher preparation institutions in Virginia. Institutions needed to train teachers in the knowledge, skills, and attitudes that teachers would need in implementing the new recommended courses listed in the model plan. Exploring Technology, Materials Processing Technology, and Communications Technology are a few examples of the courses developed in the plan. In the past, many teacher preparation institutions based their curricula on the material areas of study such as woodworking, metalworking, drafting, plastics, ceramics, electricity, and graphic arts. The new trend, as suggested by state and national changes, is to move the curricula toward a conceptual approach of the areas of production, transportation, and communication. (Ritz).

With the inception of the conceptual approach to industrial

arts, the term, competency based education, or teaching by objectives, has become more of a reality. Houston and Warner, in their article in "Educational Technology", June, 1977, stated that,

> "Although several studies failed to find significant relationships between student achievement and student knowledge of objectives, the preponderance of research confirmed the hypothesis that students who know the specific objectives of instruction achieve more than those unaware of the objectives." (Houston and Warner, 1977).

In current literature the term "competency-based" is becoming more popular, but no matter what term is used, the approach is a performance-based program. In simple terms competency based industrial arts education is a systematic approach to instruction, aimed at accountability, based on set standards and supported by a feedback mechanism.

In all systems of competency based education, regardless of what they are called, the components are fundamentally the same. Some systems may describe fewer steps, and some may describe more, but if they are analyzed, they look very much alike (Hirst, 1977).

Competency-based vocational education programs are programs in which the performance objectives are specified and agreed to, in rigorous detail, in advance of instruction. Students know what they are expected to be able to do before they complete the program and what standards of workmanship will be expected of them. Students will be held accountable for attaining a minimum level of competency in performing certain tasks, and not for simply achieving passing grades. They must demonstrate competency by performing tasks while the instructor rates the performance using a checklist or other objective measures. The emphasis placed is on exit rather than entrance requirements.

Each learning experience requires successful completion and demonstration of performance. A student may however prove his/her competence at anytime by "testing out" (completing specified skill performance) instead of completing all the learning activities designed to teach that skill. They may pre-test out, based on learning through general life experiences.

This way students do not spend time on previously learned skills (Cilley, Elson and Oliver, 1977).

There are various reasons for the overwhelming interest in competency based education, but probably the most important is a citizen concern for accountability in education. The state of Florida has been a leader in demanding accountability in education from its school systems. It has been committed to educational accountability since the late sixties. Interest arose, and the state began to develop laws, when various citizen reports and special study groups revealed a lack of common commitment to goals in education. The accountability laws that were passed by the Florida legislature were not passed and then forgotten. The lawmakers, with the help of Florida educators and department of education staff, created a workable system of accountability. The Florida House and Senate acted on the issue and passed the 1976 Education Accountability Act by a unanimous vote (Fisher, 1978). The Virginia state legislature soon followed Florida's lead and passed similar laws, though not specifically called accountability laws.

The implementation of the legislation for competency based education is not without its problems. Many hidden costs are involved in the program which can cost tax dollars.

Set-up cost of legislation is one example of a hidden cost. In order for a legislature to propose a good set of regulations, hearings, studies, and the collection of data will need to be funded. There will also be a need for periodic revisions in the program.

Implementation costs are another example of hidden cost. These involve information costs to the regulatory agency in deciding how to impliment the law. Pilot testing of the program is a necessity in implementation costs.

Administrative record-keeping, administering tests, centralized reporting systems and state regulation overseeing or enforcement costs will weigh heavily on programs. Other costs which need to be taken into account will also occur after programs are instituted. These costs could be for auditing of

funds, legal costs, and knowledgable professional staff personnel. As has been pointed out the costs are high but the results should be worth those costs (Anderson and Lesser, 1978).

Funding of competency based education is just one of the concerns of educators. Cox in her article "A Teacher's Concerns About Virginia's Competency Tests", in the Virginia Journal of Education, November, 1979, relates other concerns in the program.

There is no doubt that since the initiation of competency based programs in Virginia, the curriculums have been narrowed in scope. This has been done in three ways. First, many school divisions have adopted textbooks that stress basic skills and drill work for all levels K-12. These textbooks, though useful to many students, often times are not appropriate for advanced students. They definitely restrict the exposure of certain concepts previously included in the curriculum. There must be provisions made for supplementary materials and/or additional textbooks for students who are capable of going beyond the basics. Conceptual learning should not be limited in order to stress basics.

Secondly, curriculum in many instances has been changed to fit minimum cimpetency tests. Children should be taught the skills they are expected to know, especially if their graduation status is to be affected by the test. This can not be taught overnight. There are items on the tests that are not taught, and this means that these items must be quickly incorporated into the present curriculums. The changing of the curriculums to meet these test needs is what presents problems.

The third narrowing of curriculum has been that of teachers teaching to the test. Sample tests were given to students using the format of the state tests. Most teachers do not like to do this; however, if a student must acquire certain skills in order to pass a test in order to receive a diploma, then it seems to be the school's responsibility to make every effort to help the student master the skill, and that includes teaching to the test.

All three of these points; a trend toward textbook adoptions

with stress on basic skills; changing the curriculum to fit the test; and teaching to the test, directly affect the curriculum and tend to limit its scope.

Cox also lists some other major concerns about the competency program in Virginia. They are: 1) the advisibility of using a single test to evaluate competencies, 2) the process of developing, implementing and financing of remedial programs for students not measuring up, 3) the professional risk in working with low ability or low achieving students, 4) the extra paperwork and record keeping and 5) the lack of preparation of teachers for the program.

All of these concerns are legitimate and deserve serious consideration if we want Virginia's competency program to be successful. The mistakes that educators make in implementing the program may adversely affect students and every attempt should be made to minimize these mistakes (Cox, 1979).

In addition to the problems and concerns of Virginia teachers with competency based education, expressed in Cox's article, there are other problems that are of concern in the implementation of the programs.

If the implementation of CBVE is to be successful, some objections to it, and some administrative problems must be overcome. To attest to the fact that this can be done there are programs that are operating effectively, teachers that are enthusiastic and students that are accomplishing the tasks set forth in the program. Among the concerns of vocational educators as they continue to prepare for competency based programs are that some students possess poor reading ability and may have difficulty with the optional individualized learning materials. Individualization may also tend to decrease student interaction and teachers will find it necessary to provide this interaction through small-group or whole class learning activities. Teachers developing instructional materials will need heavy investments of time and resources.

The assessment of student competencies requires thorough program management on the part of the teacher. This means that there is a need for more objective and readily administered

assessment techniques in order to aid the teacher. The programs will pose a number of challenges for innovative administration. Some of these administrative innovations are how to award credit and charge fees, how to schedule open entry/open exit programs, how to reconcile the need to account for student's time with the principle of open exit, and how to provide students with consumable instructional materials and new instructional resource centers (Cilley, Elson and Oliver, 1977).

There is much agreement that the implementation of competency based vocational education can be accomplished successfully, and that the programs most assuredly will be worth the effort and resources required. By polling state and regional resources, making materials generally available to the profession, and sharing the knowledge acquired by experience, vocational educators can meet the challenges (Cilley, Elson and Oliver, 1977).

The setting of goals and teaching by objectives is the heart of competency based education. In CBE the objectives are specified as observable, measurable activities that are useful to teachers in shaping their instruction. The objectives are visibly posted and therefore students are aware from the first day what they are expected to achieve, and this takes away the guesswork on the part of students and teachers. Individuals in CBE pace themselves and select various learning activities with the guidance of the teacher as a resource person. There is no time limit placed on learning. In CBE each objective must be mastered before continuing to the next level of instruction (Cilley, Elson and Oliver, 1977).

Once competency objectives have been developed, the next challenge, for educators, is to link those outcome objectives directly and systematically with training practices and procedures. Today too many programs include well-worded and well-intended competencies that bear little or no relationship to either program activities or to criterion requirements for program completion (Houston and Warner, 1977).

Probably one of the best ways to deliver the elements of

competency based instruction is through learning activity packages or LAPs. They serve as a good vehicle for delivery of instruction. The LAP can supplement basic shop instruction in a provisional lecture/demonstration or help to supply remedial and enrichment activities.

The ideal LAP package contains a clear and concise statement in the form of an introduction which gets the student "tuned-in" to what the LAP is to accomplish. It contains clear definitive statements, in the form of behavioral objectives, of the competencies that are expected of the student upon completion of the LAP. A well designed LAP will contain pre-tests and post-tests that are developed and designed to reflect the same kind of activities as those stated in the behavioral objectives. Self-tests allow to student to assess knowledge gained in the content and also serve as a review instrument for covering the stated objectives. This is also an important element of the LAP. To complete the LAP design alternate activities must be included. They must correlate with the behavioral objectives and guide students to outside resources, texts, and audio-visual materials that will reinforce the students' understanding of the subject area (Hird, 1979).

The LAP will serve as one means of students instruction and evaluation but other evaluation methods must be developed. Tests will be needed to evaluate students in the cognitive, psychomotor and affective domains of learning.

## TESTING METHODS

There are several testing methods that can be employed to evaluate students in the three learning domains. In some domains one testing method may prove to be satisfactory in others it may not be adequate to evaluate students abilities or knowledge.

Tests that are developed will probably take one of three forms. The first evaluative instrument to test a student's cognitive or knowledge skills will be in the form of a written test. In developing these tests, the educator must be sure that statements in the test are developed from the pre-requisite elements identified in the program. He should use multiple choice,

true/false test when possible and also use pictures and diagrams to better explain the points which the evaluation is stressing. An example would be for the student to read and identify certain things from a drawing. The second evaluative instrument used to test the student's psychomotor skills is an individual performance test. The student will actually perform the desired tasks in a stated fashion while the instructor observes and compares the student's performance to a rating sheet that specifies standards for the particular performance (Baker, 1974).

Another evaluative method for the psychomotor learning domain is to have the student construct a specific project from a pre-determined set of plans and procedures to a predetermined tolerance. The third form of test would evaluate the affective or attitudinal skills of the student. Schab in his article "What Vocational Students Think About Minimum Competencies" reports the results of a form of opinion poll given to 227 vocational students to evaluate their attitudes toward minimum competency requirements. He summarized his findings of what vocational students believe a high school graduate should be capable of doing upon completion of a program of learning (Schab, 1978). His survey instrument is a good example to follow in developing other attitudinal surveys. Other evaluative methods may be developed for testing competencies in the future but these three methods seem to be most effective.

## SUMMARY

What began as a new idea in secondary education in California, Florida, Oregon and several other states in 1975 and 1976, has now become popular in many other states. As of March, 1978, thirty-three states had taken some action to mandate setting minimum competencies for elementary and secondary students. In future years more and more states are expected to join in similar legislation (Pipho, 1978).

The information found in the review of literature was very limited and in many cases very redundant. This is probably because of the comparatively short history of competency based education as it is known today. Though limited in its avail-

ability, the information found in the review of literature helped in the understanding of CBE and CBI, and provided a background for developing evaluative instruments for Industrial Arts Woods Technology I.

# CHAPTER III

## METHODS AND PROCEDURES

This chapter described the methodology used in conducting the research. It included: The domain grouping of tasks identified in the Industrial Arts Education Competency Catalog for Woods Technology I, the types of instruments selected, the components of the evaluative instrument, and a summary of the material gathered and applied.

The reason for developing this research topic was that there appeared to be no evaluative instruments that had been developed for testing students in the cognitive, psychomotor, and affective learning domains for Woods Technology I. The procedure of reviewing literature proved this to be true.

### TASK GROUPING

Tasks that were defined in the Industrial Arts Education Competency Catalog for Woods Technology I were grouped according to the domain in which they would be evaluated (see Appendix D). These groupings were put in the cognitive, psychomotor and affective learning domains. This grouping of tasks made the development of the evaluation instruments more meaningful and relevant to the goals established for the research.

### TYPES OF INSTRUMENTS

In competency based education students should be evaluated in the cognitive or knowledge domain, the psychomotor or skill domain, and the affective or attitudinal domain. Since industrial arts encompasses all these domains, tests were developed to evaluate students' competencies of the stated tasks. A written test was developed to evaluate students in their knowledge of stated tasks. The testing of the psychomotor skills was accomplished by developing a plan sheet for students to construct a mail box using stated procedures and pre-determined tolerances. An attitudinal survey or inventory was developed to attain students' attitudes toward the stated tasks

and woods technology competency based instruction in general. These instruments were developed based on program and students' needs.

## INSTRUMENT DESCRIPTION

The evaluative instruments included descriptions of the instrument, objective to be met, instructions to students, space for student response, directions to the evaluator and space for the evaluators response. The instruction to the evaluator included the objectives restated, how scoring of the evaluation was to be accomplished, answers to questions and tolerances to be met and a listing of any demonstrations to be performed by the student. It also included any other information necessary for the evaluator to fairly evaluate the student. These are items that are usually standard format for any good evaluation instrument construction.

The cognitive evaluative instrument was comprised of true/false and multiple choice questions. This gives students a variety of ways to respond and also enables easy correcting by the evaluator.

The psychomotor evaluative instrument was designed as a specific set of plans from which the student would follow the stated procedures and construct a mail box. This project would have to be within a tolerance of (+) or (-) 1/8" of dimensions specified in the plan sheet.

The affective evaluative instrument was constructed as an attitudinal survey based on the Likert Scale, where the respondants are locked into a five response closed end form of answer. They may respond as strongly agree - agree - undecided - disagree - strongly disagree. This format enables the evaluator to quickly tabulate the responses and to draw conslusions.

It is hoped that students will gain knowledge through lessons, practice through lab work training, attitudinal development through class discussion, and evaluation of the competency tasks taught through the evaluative instrument developed in this research study.

# CHAPTER IV

## FINDINGS

Upon reviewing the Industrial Arts Education Competency Catalog for Woods Technology I, the researcher found that no provisions had been made to evaluate students upon successful completion of assigned tasks. This lack of an evaluative instrument inspired the researcher to choose the development of an evaluative instrument as a research topic.

In this chapter the knowledge gained from the review of literature was developed into evaluation instruments to test students' competencies in Industrial Arts Woods Technology I.

## TEST DEVELOPMENT

The development of the test instruments was successfully completed after reviewing the Industrial Arts Education Competency Catalog for Woods Technology I, related periodicals and research papers covering various aspects of competency based education in industrial and vocational education.

After reviewing related literature and research, Evaluative instruments in the cognitive, psychomotor and affective learning domains of Woods Technology I were developed and included in this chapter. (Appendices A,B,C)

The individual tests for each learning domain were developed after the tasks stated in the Industrial Arts Education Competency Catalog for Woods Technology I were grouped according to the learning domains. Some tasks might be grouped into more than one domain.

The tasks which fell within the cognitive domain were used to develop a written true/false, multiple choice test to evaluate the knowledge gained by a student while completing the Woods Technology I course. This test included topics on careers, safety, wood selection, hand tool selection, machine use, construction techniques and finishing methods and materials.

The tasks which fell within the psychomotor domain were

used to develop a project which students would construct to demonstrate the skills learned while completing the Woods Technology I course. This project required the students to demonstrate skills using their knowledge of various hand tools and machines to construct a wood mailbox.

The tasks which could be evaluated within the affective domain were used to inventory students attitudes toward Competency Based Education and their evaluation of the Woods Technology I program. The students could respond: (SD) Strongly Disagree, (D) Disagree, (U) Undecided, (A) Agree (SA) Strongly Agree.

The results of the findings in this chapter have contributed to the development of a much needed part of the Industrial Arts program. Chapter V will deal with the results of the findings in this chapter and will include conclusions and recomendations for further study and follow-up.

# CHAPTER V
# SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

## SUMMARY

The purpose of this study was to examine current Virginia state curriculum in industrial arts and determine if there was a need for competency tests to evaluate students' mastery of the tasks stated in Woods Technology I. The study determined a need and an evaluative instrument was developed.

The study was limited to the Commonwealth of Virginia and the tasks outlined in the Industrial Arts Education Competency Catalog for Woods Technology I. The study specifically:

1. Examined the need for an evaluative instrument to test students' mastery of the tasks stated in the competency catalog.
2. Reviewed the Industrial Arts Education Competency Catalog for Woods Technology I and grouped the tasks into the cognitive, psychomotor and affective domains.
3. Gathered information concerning competency based education through the review of literature and used this information to reach the researchers' stated goals.
4. Developed three evaluative instruments to test minimum competencies of students' mastery of tasks in the cognitive, psychomotor, and affective domains.

## CONCLUSIONS

The following conclusions were drawn from a review of related research and literature and an analysis of data collected:

1. There is a definite need for evaluative instruments to be developed for testing students'minimum competencies in Woods Technology I.
2. The tasks identified in the competency catalog for Woods Technology I needed to be grouped according to learning

domains.

3. The evaluative instruments should be designed to test students in the cognitive, psychomotor and affective domains.

4. The Cognitive, Psychomotor, and Affective instruments were developed based upon review of the literature and V.I.A. Competency Catalogs for Woods Technology I.

## RECOMMENDATIONS

The following recommendations are the result of observations and conclusions reached by the observer in conducting this study:

1. Research further the testing of students of industrial arts competency education.

2. Local school districts should promote public awareness of the goals and methods set forth for competency based education.

3. Pilot test the evaluative instrument developed in this study.

4. Do a follow-up study on information gathered from the implementation of the pilot test and revise the test where needed.

5. After pilot testing the evaluative instrument and doing a follow-up study and revision, publish and distribute it to individual school districts through the State Board of Education.

6. Develop Learning Activity Packages for Woods Technology I using thr grouped tasks from this research.

7. After a test period, possibly two years, do a follow-up study to determine the effectiveness of competency based education using former graduates as subjects.

8. Recomend the development of evaluation instruments for the following Virginia Industrial Arts courses: Architectural Drawing, Basic Technical Drawing, Electricity and Electronics, Energy and Power, Engineering Drawing, Graphic Communications, and Metals Technology.

# BIBLIOGRAPHY

## Articles

Anderson, Barry D. and Lesser, Phillip, "The Cost of Legislated Minimum Competency Requirements". Phi Delta Kappan, (May 1978), p. 606-608.

Baker, G. E., "Performance Based Instruction in Electronics". Industrial Education (Nov. 1974), p. 54-55.

Cilley, Richard N., Elson, Donald E. and Oliver, J. Dale, Participants Guide for Inservice Training, Division of Vocational - Technical Education Virginia Polytechnic Institute and State University, Blacksburg, Virginia, 1977.

Cox, Judy, "A Teacher's Concerns About Virginia's Competency Tests". Virginia Journal of Education. (Nov. 1979), p. 15-17.

Fisher, Thomas H., "Florida's Approach to Competency Testing". Phi Delta Kappen (May 1978), p. 599-601.

Hird, Kenneth F., "Learning Activity Packages for Competency Based Instruction". School Shop, (Feb. 1979), p. 28-29.

Hirst, Jr., Ben A., "The Components of Competency Based Vocational Education". American Vocational Journal, (Nov. 1977), p. 32-35.

Houston, W. R. and Warner, A. R., "The Competency-Based Movement: Origins and Future". Educational Technology, (June 1977), p. 14-19.

Joyner, David I. and Ritz, John M., Industrial Arts Education Competency Catalog for Woods Technology. Department of Vocational and Industrial Arts Education Old Dominion University, Norfolk, Virginia, 1979.

Oliver, J. Dale, "Measuring Students Competencies". American Vocational Journal, (Jan. 1978), p. 48-51.

Pipho, Chris, "Minimum Competency Testing in 1978: A Look at State Standards". Phi Delta Kappan, (May 1978), p. 585-588.

Ritz, John M., "The Identification and Validation of Competency Tasks for the Communication Technology Area of Industrial Arts Teacher Preparation" Man/Society/Technology, (Nov. 1979), p. 34-35.

Schab, Fred, "What Vocational Students Think About Minimum Competencies". American Vocational Journal, (Jan. 1978), p. 61-62.

The General Assembly of Virginia, Standards of Quality for Public Schools in Virginia, 1978.

Books

Feirer, J. L., Industrial Arts Woodworking. Second Edition. Charles A. Bennet Co., Inc., Peoria, Illinois, 1965.

Feirer, J. L., Cabinetmaking and Millwork. Charles A. Bennet Co., Inc., Peoria, Illinois, 1970.

# APPENDIXES

# APPENDIX A

# WOODS TECHNOLOGY I

# COGNITIVE EVALUATION

# WOODS TECHNOLOGY I COGNITIVE EVALUATION

Purpose:

The purpose of this test is to evaluate your knowledge and competence in the mastery of the tasks which have been presented to you in Woods Technology I.

Objective:

After having been presented the lessons and demonstrations necessary, the student will complete the following evaluation by answering to the best of his ability a minimum of 75% correct answers within a one hour period.

Instructions to student:

Using a #2 lead pencil, fill in your name, date and class period on the answer sheet. You will have one hour to complete the evaluation. Blacken in only one response and, if you make a mistake, erase the mistake completely. Re-mark your correct choice. Answer all questions to the best of your ability and please do not write on the test.

Sample Question:

When ripping wood which is less than 3" wide you should use _____ to push the wood through the saw:

A. Your fingers.
B. A steel rod.
C. A piece of plastic.
● A push stick.

# WOODS TECHNOLOGY I
# COGNITIVE EVALUATION

Directions for the evaluator: The following are the correct answers for the cognitive evaluation.

| Question | Answer | Task | Question | Answer | Task |
|---|---|---|---|---|---|
| 1. | D | 1 | 26. | B | 17 |
| 2. | B | 1 | 27. | A | 19 |
| 3. | C | 2 | 28. | C | 21&34 |
| 4. | A | 2 | 29. | A | 21 |
| 5. | C | 3 | 30. | A | 21 |
| 6. | A | 3&5 | 31. | B | 22 |
| 7. | B | 4 | 32. | D | 22 |
| 8. | C | 4 | 33. | C | 22 |
| 9. | C | 4&6 | 34. | A | 23 |
| 10. | C | 7 | 35. | A | 24 |
| 11. | B | 7 | 36. | C | 25 |
| 12. | D | 8 | 37. | C | 26 |
| 13. | B | 9 | 38. | B | 27 |
| 14. | B | 9 | 39. | B | 29 |
| 15. | C | 9 | 40. | B | 30 |
| 16. | B | 10 | 41. | A | 30 |
| 17. | B | 11 | 42. | D | 31 |
| 18. | B | 14 | 43. | C | 31 |
| 19. | E | 13 | 44. | C | 32 |
| 20. | D | 14 | 45. | D | 32 |
| 21. | C | 14 | 46. | A | 33 |
| 22. | B | 15 | 47. | B | 34 |
| 23. | C | 15 | 48. | B | 35 |
| 24. | B | 18 | 49. | B | 35 |
| 25. | C | 16 | 50. | D | 36 |

Mark the incorrect answers on the evaluation and record the score on the student evaluation summary sheet. List tasks which have been mastered and also those tasks which need review.

# WOODS TECHNOLOGY I
# COGNITIVE EVALUATION

1. The person who hires people, sub-contracts work, plans and coordinates the building of a house is which of the following?

   A. Roofer
   B. Plumber
   C. Architect
   D. Contractor

2. A person who installs baseboards, window trim, door trim, and other moldings in a house is which of the following?

   A. Frame Carpenter
   B. Trim Carpenter
   C. Roofer

3. When you enter a shop class you should:

   A. Stop talking
   B. Rush to finish your project
   C. Put on safety glasses
   D. Put on an apron

4. Which of the following is the <u>least</u> important when working in the shop?

   A. Talking to other people
   B. Not wearing safety glasses
   C. Not paying attention to what you are doing
   D. Working too fast and rushing your project

5. Which part of a tree is lighter in color and is newer growth than the heart?

   A. Heart wood
   B. Pith
   C. Sapwood
   D. Bark

6. Which way do the fibers in a tree run?

   A. Up and down direction
   B. Cross ways direction
   C. Random direction

7. Hardwood comes from trees which:

   A. Have cones
   B. Have broad leaves and shed their leaves
   C. Have needles and do not shed

8. Which of the following would be considered a softwood?

   A. Walnut
   B. Maple
   C. Pine
   D. Cherry

9. What kind of wood is generally used in residential house construction?

   A. Oak
   B. Mahogany
   C. Yellow pine
   D. None of above

10. The best method of drying lumber is:

   A. Air drying
   B. Chemical drying
   C. Kiln drying
   D. None of the above

11. Which method of drying lumber is the fastest?

   A. Air drying
   B. Kiln drying
   C. Radio frequency
   D. None of the above

12. Drying wood to the correct moisture content prevents

   A. Warping
   B. Checking
   C. Cupping
   D. All of the above

13. A board foot is a piece of wood:

   A. 3/4" X 11⅛" X 11⅛"
   B. 1" X 12" X 12"
   C. 12" X 12" X 12"

14. A board foot contains:

   A. 144 Sq. In.
   B. 144 Cu. In.
   C. 200 Cu. In.
   D. None of the above

15. When measuring linear feet you only deal with:

   A. Thickness
   B. Width
   C. Length

16. Which is stronger in construction?

A. 1" X 12" Pine
B. Plywood
C. Particle board

17. Wood Veneer is:

A. Painted on wood grain
B. Thin sheets of wood glued to a surface
C. Plastic glued to a surface
D. None of the above

18. Which mark on the rule is 3/8"?


A. B. C. D.

19. A plan sheet is an important part of planning. Which of the following is necessary to include on a plan sheet?

A. Pictorial drawing
B. Working or dimention drawing
C. Parts list
D. Procedures list
E. All of the above

20. Which of the following <u>is</u> <u>not</u> a measuring tool?

A. Bench rule
B. Steel tape
C. Carpenter square
D. T-bevel

21. Which of the following squares is the most universal for use in the shop?

A. Framing square
B. Try square
C. Combination

22. Which kind of hand saw has knife type teeth?

A. Rip saw
B. Crosscut saw
C. Back saw
D. Combination

23. Which kind of hand saw has combination type teeth?

A. Rip saw
B. Crosscut saw
C. Back saw
D. None of the above

24. What accessory is used with a backsaw to cut angles?

A. Combination square
B. Miter box
C. T-bevel

25. Which hand plane is the most widely used?

A. Fore plane
B. Block plane
C. Jack plane
D. None of the above

26. When using a chisel you should only strike the chisel with a :

A. Claw hammer
B. Wooden mallet
C. Ball peen hammer

27. Which of the following is <u>not</u> an edge cutting tool?

A. Rasp
B. Surform tool
C. Hand plane
D. Chisel

28. The chuck of an electric hand drill and a drill press contains how many jaws?

A. Four
B. Two
C. Three
D. None of the above

29. The proper bit to use in a brace is a:

A. Auger bit
B. Speed bit
C. Twist bit
D. Foerstner bit

30. The bit which can be varied in size is called:

A. Expansion bit
B. Foerstner bit
C. Auger bit
D. Twist drill

31. When selecting nails for a project is a #4 finishing nail larger or smaller than #6 finishing nail

A. Larger
B. Smaller

32. Which kind of nails are most used in a shop class?

A. Common
B. Box
C. Roofing
D. Finishing

33. How far should nails be set below the surface?

A. $\frac{1}{2}$"
B. $\frac{1}{4}$"
C. 1/8"
D. None of the above

34. Which type of fastener would you select if you were hanging a heavy mirror on a plaster wall and you wanted to be able to take the screw in or out?

A. Molly bolt
B. Toggle bolt
C. Lead shield
D. Plastic shield

35. What is the most popular type of glue used in the shop?

A. White resin
B. Brown powdered glue
C. Epoxy glue

36. How is the best way to raise dents in wood?

A. Fill with filler
B. Sand smooth
C. Put water on it

37. When selecting sandpaper which is finer?

A. 120 grit
B. 100 grit
C. 220 grit

38. Will stain cover spots where glue has gotten on your wood?

A. Yes
B. No

39. Can lacquer be put on over other oil base finishes?

A. Yes
B. No

40. The part of the tablesaw used for 'ripping' is the:

A. Miter gauge
B. Fence
C. Table
D. None of the above

41. The part of the tablesaw used for crosscut is the:

A. Miter gauge
B. Fence
C. Table
D. None of the above

42. How far above the wood should the guard and blade guides be placed on the bandsaw?

A. 1"
B. 1/2"
C. 1/4"
D. 1/8"

43. Which of the following can not be cut on the band saw?

A. Miters
B. Outside curves
C. Inside curves
D. Straight cuts

44. If you wanted to make a smooth cut on the scroll saw which of the following blades would give you the smoothest cut?

A. 6 teeth/in.
B. 8 teeth/in.
C.10 teeth/in.
D. None of the above

45. Which of the following cuts can be made on the scroll saw?

A. Straight cuts
B. Inside curves
C. Outside curves
D. All of the above

46. Can the drill press be set up to drill a series of holes to the same depth?

A. Yes
B. No

47. Which of the following bits can not be used in the portable electric drill?

A. Twist bit
B. Auger bit
C. Foerstner bit
D. Speed bit

48. Should the portable orbital hand sander be used on the edge of a board?

A. Yes
B. No

49. The primary use of the portable orbital sander is:

A. For fast removal of wood
B. Finish sanding
C. Sanding outside curves

50. When should the portable saber saw be used?

A. When a scroll or jig saw is not available
B. For inside curves on thick as well as thin wood
C. For outside curves
D. All of the above

# APPENDIX B

# WOODS TECHNOLOGY I

# PSYCOMOTOR EVALUATION

# WOODS TECHNOLOGY I PSYCHOMOTOR EVALUATION

Purpose:

The purpose of this test is to evaluate your skills and competence in the mastery of the tasks which have been presented to you in Woods Technology I.

Objective:

After having been presented the lessons and demonstrations necessary, the student will complete the assigned project, following the plan sheet, to a tolerance of (+) or (-) 1/8" on all dimensions using good craftmanship.

Instruction to student:

You will be given 7 linear feet of #3 1x12 pine shelving and a detailed plan sheet. The plan sheet contains a pictorial drawing,working drawing,parts list,and procedures list. Using this plan you will follow the listed procedures and complete the mailbox within a three hour period. Additional time will be given for applying the finish. No help will be given by the instructor, but you will be observed for safety procedures and craftsmanship techniques. If you need additional materials or tools ask your instructor. Your tolerance for error will be (+) or (-) 1/8" on all dimensions. Answer the related questions at the end of the test. Please do not write on the test.

Materials Required:

7 LF #3 1x12 pine shelving
White glue
20 #6 Galvanized finishing nails
Pattern material (for sides and scroll)
3 sheets 220A Garnet sandpaper
3 sheets 120A Garnet sandpaper
Finishing material demonstrated in the course
1 pair 3/4" x 1½" solid brass butt hinges

Tools and Equipment to be Used:

All hand tools, power tools and machines demonstrated in the Woods Technology I course.

# WOODS TECHNOLOGY I
# PSYCOMOTOR EVALUATION

## Directions to the Evaluator

Using the following checklist. evaluate the students' project which was constructed for the psycomotor evaluation. Evaluate the project for neatness. quality and accuracy of dimensions. Record the results in section II of the student evaluation summary sheet.

## Evaluator's Response

Evaluate the project using the following criteria.

| | | | |
|---|---|---|---|
| 1. | Is the project neat in appearance? | Yes | No |
| 2. | Did the student appear to follow the procedures stated in the plan sheet? | Yes | No |
| 3. | Did the student follow accepted safety practices? | Yes | No |
| 4. | Did the student use the correct machines and tools in construction of the project? | Yes | No |
| 5. | Is the project square? | Yes | No |
| 6. | Was the project properly sanded? | Yes | No |
| 7. | Do the joints fit well? | Yes | No |
| 8. | Are the dimensions within (+) or (-) 1/8" of those stated in the plan sheet parts list? | Yes | No |
| 9. | Did the student apply a finish to his/her project? | Yes | No |
| 10. | Was the proper finish selected and properly applied? | Yes | No |
| 11. | Was the proper hardware selected and applied? | Yes | No |

Task Mastery Evaluation

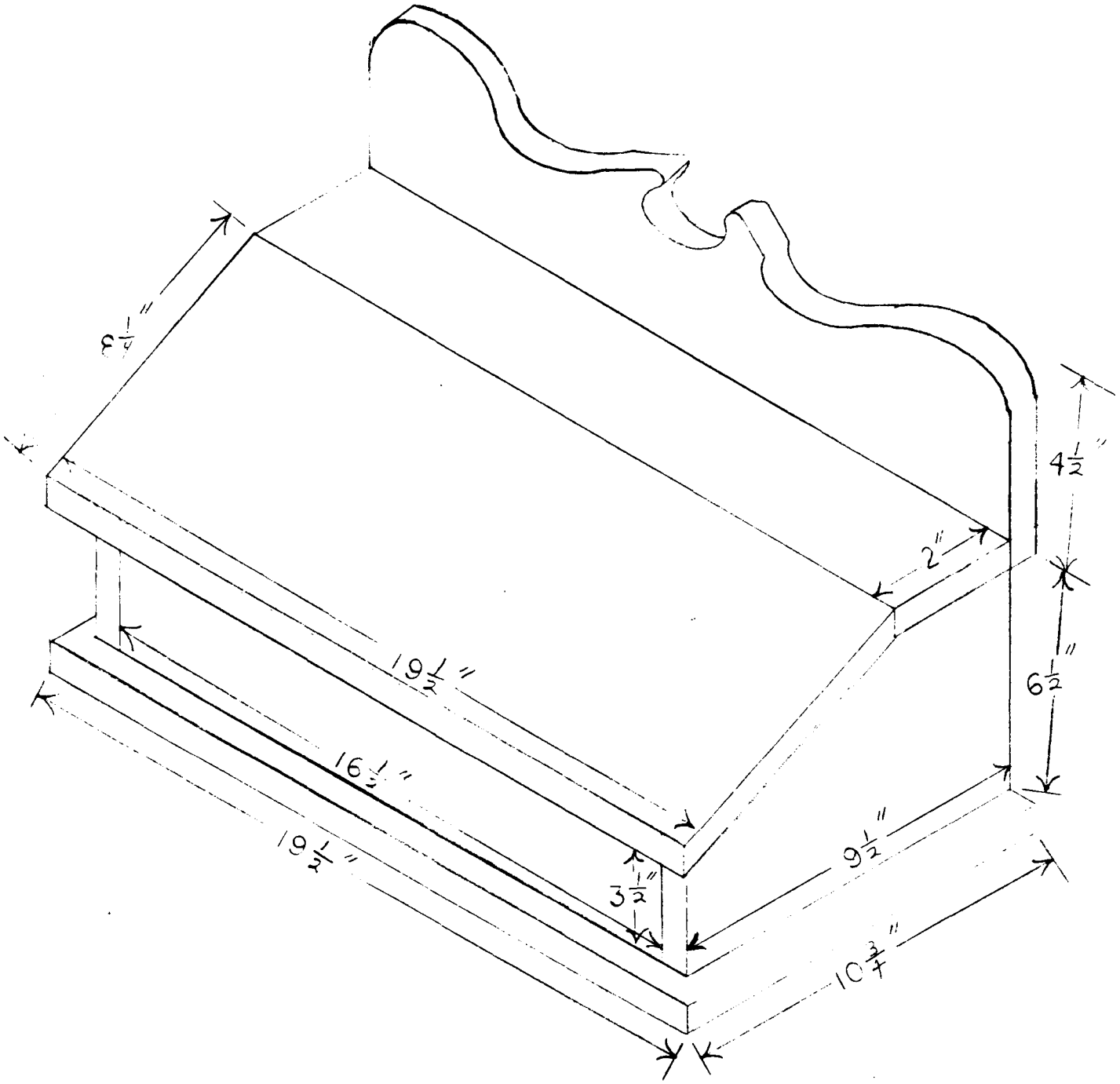
Using the above checklist results, evaluate the students' mastery of the tasks. Positive responses will indicate mastery of the tasks and negative responses will indicated a need of review. Evaluate tasks using the following key.

| Question | Tasks |
|---|---|
| 1. | 13 |
| 2. | 13 |
| 3. | 2 |
| 4. | 15-21 hand tools 30-35 machines |
| 5. | 14 |
| 6. | 26 and 35 |
| 7. | 22 and 24 |
| 8. | 13 |
| 9. | 27-29 |
| 10. | 27-29 |
| 11. | 23 |

WOODS TECHNOLOGY I

PSYCOMOTOR EVALUATION

**MAILBOX PLAN SHEET**



MAILBOX PLANS PROCEDURES LIST

1. Make patterns and layout on 7LF of 1"X 12" shelving.
2. Crosscut 2ea. 19½" boards from shelving.
3. Crosscut 1ea. 16½" board from 1"X 12" board.
4. Rip one of the 19½" boards into two pieces 2" and 8¼" for top and top lid.
5. Rip the other 19½" board to 10 3/4" for the base.
6. Rip the 16½" board into two pieces 3½" and 6½" for front and back.
7. Take the remaining material and rip into two pieces 6" wide for the sides and the scroll 4½" wide.
8. Crosscut the previous piece of 6" material into two pieces 9½" long for sides.
9. Take the remaining 4½" piece and crosscut to 19½" long and trace the pattern for scroll on it.
10. Take one of the sides and measure 2 3/4" from the corner with the grain and on the diagonal corner measure 3½" across the grain. Draw a diagonal line from point to point.
11. Nail 2 sides together temporarily and cut diagonal on the bandsaw.
12. Cut scroll out on the bandsaw.
13. Route 3 sides of the bottom and top lid and the 2 ends of the top using a 3/8" rounding over bit.
14. Assemble by attaching 2 sides to the back and front using 2 ea. #6 finishing nails in the front and 3 ea. #6 finishing nails in the rear.
15. After assembling this unit, route the front and rear of the sides using 3/8" rounding over bit.
16. Attach top to sides using 2 ea. #6 finishing nails in each end of the top.
17. Attach bottom to assembled unit using 2 ea. #6 finishing nails in ends and 1 ea. in the front and back between the ends.
18. Drill 2 ea. 5/8" holes in scroll and finish cutting out.
19. Attach scroll to assembled unit.
20. Cut beveled edge on side of top lid that has not been routed to the angle of the sides.
21. Cut notches in top lid and top for hinges.
22. Make attachments for scroll, glue and nail using one #4 finishing nail in each side.

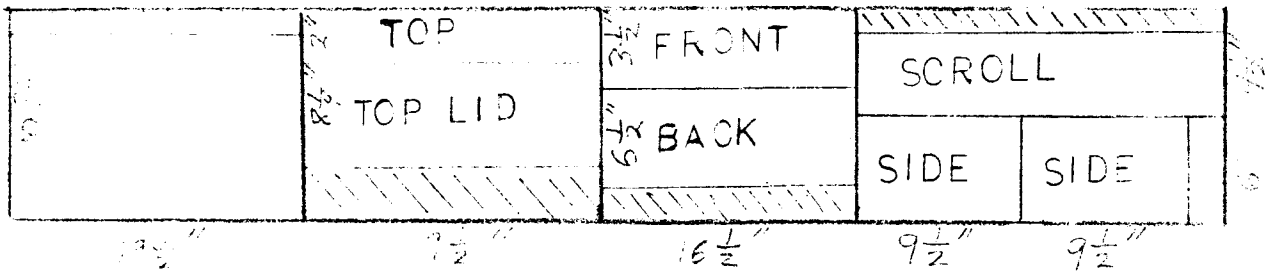
23. Sand using 120A garnet sandpaper.
24. Prime and seal.
25. Finish as desired.

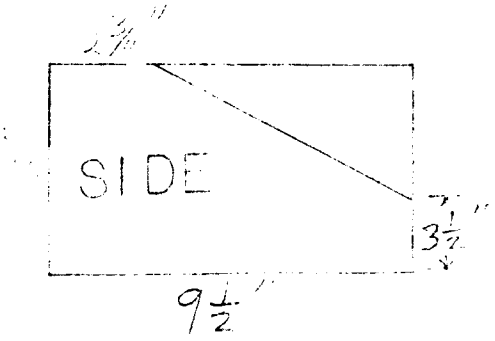
## PARTS LIST FOR MAILBOX

1 pair 3/4" X 1½" brass butt hinges
Base 3/4" X 10 3/4" X 19½"
Top 3/4" X 2" X 19½"
Top Lid 3/4" X 8¼" X 19½"
Front 3/4" X 3½" X 16½"
Back 3/4" X 6½" X 16½"
Scroll 3/4" X 4½" X 19½"
2ea. Sides 3/4" X 6" X 9½"
2ea. Attachments ¼" X 1" X app. 2½"

## LAYOUT

7 Linear Feet of 1 X 12 pine shelving



# APPENDIX C

# WOODS TECHNOLOGY I

# AFFECTIVE EVALUATION

# WOODS TECHNOLOGY I AFFECTIVE INVENTORY

Purpose:

The purpose of this inventory is to evaluate the attitudes of students toward competency based education for Woods Technology I.

Objective:

After having been presented the lessons and demonstrations necessary, and upon completion of the program, the student will express his/her attitudes toward competency based education in Woods Technology I. Students must complete 100% of the questions in the inventory.

Instructions to student:

Now that you have completed the Woods Technology I program, you are requested to respond to the following questions with frank, honest responses. The questions have five possible responses from which you may choose. Blacken in your best response. Your possible answers are:

(SD) Strongly Disagree
(D) Disagree
(U) Undecided
(A) Agree
(SA) Strongly Agree

Sample Question:

I feel that operating machines safely is the most important part of the Woods Technology I course.

SD D U (A) SA

This answer would indicate that the student strongly agrees that machine safety is an important part of the Woods Technology I course.

# WOODS TECHNOLOGY I
# AFFECTIVE EVALUATION

Directions to the evaluator: Evaluate the affective evaluative instrument according to the following guide. SD and D choices indicate a negative response, A and SA indicate a positive response, and U indicates a neutral response. U is not counted in the totals. Using the following key, indicate on the evaluation instrument those questions which do not correlate.

KEY

| Question | Correct Response | Tasks |
|---|---|---|
| 1. | + | 1 |
| 2. | + | 2 |
| 3. | + | 4 |
| 4. | + | 7 |
| 5. | - | 9 |
| 6. | + | 10-12 |
| 7. | - | 13 |
| 8. | + | 14 |
| 9. | + | 15-21 |
| 10. | - | 22 |
| 11. | + | 23 |
| 12. | + | 25-26 |
| 13. | + | 30 |
| 14. | - | 31 |
| 15. | + | 34-36 |
| 16. | - | General (no task) |
| 17. | + | AIASA |
| 18. | + | General (no task) |
| 19. | + | General (no task) and 1 |
| 20. | + | General (no task) |
| 21. | + | AIASA |
| 22. | + | AIASA |
| 23. | + | 1 |
| 24. | + | 1 |
| 25. | + | General (no task) and 13 |

Evaluator's Response: After evaluating the students' responses and comparing them with the key, rate the students' mastery of the tasks by the number of correct responses. Record the tasks, which have been mastered and those which need review on the student summary sheet. Use the above key to determine tasks.

# WOODS TECHNOLOGY I
# AFFECTIVE EVALUATION

Key: SD - Strongly Disagree
D - Disagree
U - Uncertain
A - Agree
SA - Strongly Agree

SD D U A SA 1. I have gained an awareness of various occupations related to the woods industry.

SD D U A SA 2. I have acquired a clear understanding and attitude toward good safety practices in the Woods Technology laboratory.

SD D U A SA 3. I have gained an awareness of the characteristics of hard and soft woods and their proper application in constructing useful projects.

SD D U A SA 4. I understand the methods of drying and the importance of properly dried wood in the construction of wood products.

SD D U A SA 5. I do not feel that I have gained a proper knowledge of figuring board feet and linear feet.

SD D U A SA 6. I feel that I have gained a clear understanding of the characteristics and uses of plywood, veneers, hardboard, and fiberboard.

SD D U A SA 7. I do not feel that I have a clear understanding of the proper procedures to follow in planning a project.

SD D U A SA 8. I feel that all students enrolled in industrial arts courses should be able to read a rule.

SD D U A SA 9. I have gained an awareness of the proper use of wood working hand tools.

| | | | | | | |
|---|---|---|---|---|---|---|
| SD | D | U | A | SA | 10. | I do not feel that I have developed a skill in the proper selection and use of nails and screws. |
| SD | D | U | A | SA | 11. | I feel that the instruction I have received in Woods Technology I. concerning selection of fasteners, will benefit me after I leave school. |
| SD | D | U | A | SA | 12. | I feel that the instruction I have received in Woods Technology I. concerning surface preparation and finishing of wood products, will enable me to perform top quality finishing. |
| SD | D | U | A | SA | 13. | I feel that the instruction I have received on the safe and proper operation of the table saw will help me to gain confidence in its use. |
| SD | D | U | A | SA | 14. | I do not feel that I have gained a skill in the safe and proper use of the band saw. |
| SD | D | U | A | SA | 15. | I have acquired a skill in the proper use of portable electric wood working tools. |
| SD | D | U | A | SA | 16. | I do not feel that it is important to properly clean and maintain tools and machines on a regular basis. |
| SD | D | U | A | SA | 17. | I feel that it is important to learn to work and cooperate with others in the woods lab because it will help me when I am working on a job. |
| SD | D | U | A | SA | 18. | I feel that the instruction I have received in this course will enable me to be a more knowledgeable consumer when purchasing wood products. |
| SD | D | U | A | SA | 19. | I will feel more confident in myself when I go to apply for a job as a result of my having taken the Woods Technology I course. |

| | | | | | | |
|---|---|---|---|---|---|---|
| SD | D | U | A | SA | 20. | I feel that I can properly design and construct a project made of wood from the knowledge I have gained in this course. |
| SD | D | U | A | SA | 21. | I believe that in order to receive the full benefit of this course, a student needs to have participated actively in the student club. |
| SD | D | U | A | SA | 22. | I feel that the leadership and fellowship that a student gains in a student club will benefit them in their future careers. |
| SD | D | U | A | SA | 23. | I believe that the knowledge I have gained in this course will be beneficial to me even if I do not pursue a woods career. |
| SD | D | U | A | SA | 24. | I am interested in pursuing a career related to woodworking. |
| SD | D | U | A | SA | 25. | I feel that now, after completing the Woods Technology I course, I am capable of reading a detailed set of project plans and successfully completing a project. |

# APPENDIX D

# WOODS TECHNOLOGY I

# TASK GROUPING

## TASK GROUPING

The following is a suggested grouping of tasks from the Industrial Arts Education Competency Catalog for Woods Technology I. They have been grouped into the cognitive, psychomotor and affective domains. The grouping of the tasks was intended to help educators in the presentation and evaluation of students' competencies in knowledge,skill and attitudes toward program design.

The suggested grouping of tasks was used in the development of the evaluative instruments for this research. They may be modified for development of future instruments.

### TASKS

KEY: C- Cognitive
P- Psychomotor
A- Affective

| TASK # | DOMAINS | DESCRIPTION |
|---|---|---|
| 1 | C,A | Woodworking Occupations |
| 2 | C,A,P | Safety |
| 3 | C,A | Wood Science-Parts of a tree |
| 4 | C,A | Wood Science-Soft Woods and Hardwoods |
| 5 | C,A | Wood Science-Tree Structure |
| 6 | C,A | Wood Science-Wood Grain |
| 7 | C,A | Lumber-Drying Wood |
| 8 | C,A | Lumber-Lumbering defects |
| 9 | C,A | Lumber-Board Feet |
| 10 | C,A | Processed Woods-Plywood |
| 11 | C,A | Processed Woods-Veneers |
| 12 | C,A | Processed Woods-Hardboard |
| 13 | C,P,A | Planning |
| 14 | C,P,A | Layout Tools |
| 15 | C,P,A | Hand Tools-Hand Saws |
| 16 | C,P,A | Hand Tools-Planes |

| TASK # | DOMAINS | DESCRIPTIONS |
|---|---|---|
| 17 | C,P,A | Hand Tools-Chisels |
| 18 | C,P,A | Hand Tools-Miter Box |
| 19 | C,P,A | Hand Tools-Surform Files |
| 20 | C,P,A | Hand Tools-Cabinet and Hand Scraper |
| 21 | C,P,A | Hand Tools-Boring Tools |
| 22 | C,P,A | Fasteners-Nails and Screens |
| 23 | C,P,A | Fasteners-Bolts and Etc. |
| 24 | C,P,A | Fasteners-Adhesives |
| 25 | C,P,A | Surface Preparation-Raising Pents and Filling |
| 26 | C,P,A | Surface Preparation-Abrasives |
| 27 | C,P,A | Finishing-Staining |
| 28 | C,P,A | Finishing-Painting |
| 29 | C,P,A | Finishing-Transparent Finishes |
| 30 | C,P,A | Power Tools-Tablesaw |
| 31 | C,P,A | Power Tools-Bandsaw |
| 32 | C,P,A | Power Tools-Jig Saw or Scroll Saw |
| 33 | C,P,A | Power Tools-Drill Press |
| 34 | C,P,A | Power Tools-Electric Drill |
| 35 | C,P,A | Power Tools-Sanders |
| 36 | C,P,A | Power Tools-Sabre Saw |

# APPENDIX E

## WOODS TECHNOLOGY I

## STUDENT EVALUATION SUMMARY SHEET

# WOODS TECHNOLOGY I
# MINIMUM COMPETENCY
# STUDENT EVALUATION SUMMARY SHEET

Student's Name _____

Grade Level _____

Dates of Evaluations _____

I COGNITIVE EVALUATION

- I Test Score
- II Tasks which have been mastered
- III Tasks which need review

II PSYCOMOTOR EVALUATION

- I Passed Failed
- II Tasks which have been mastered
- III Tasks which need review

III AFFECTIVE EVALUATION

- I Student's attitude responses indicate mastery of tasks
  - A. Yes
  - B. No (Circle One)
- II Tasks which have been mastered
- III Tasks which need attitudnal change