THE DEVELOPMENT OF A METHOD OF PRETESTING STUDENT ABILITY TO UNDERSTAND AND APPLY PRINCIPLES OF CLOTHING CONSTRUCTION

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Testing programs in institutions of higher learning have become increasingly important as college and university enrollments have increased. The major impetus in the field of measurement and evaluation has occurred within the past sixty-five years. The most recent trend in testing is toward evaluation of ability to understand and apply principles involved rather than testing for mere facts.

In this study, two equivalent evaluation instruments, Form A and Form B, were developed to test student ability to understand and apply four specific principles of clothing construction prior to formal college instruction. Test items were labeled either "understanding" or "application." In addition, an experience questionnaire was formulated to obtain information concerning students' previous clothing construction experiences. Michigan State University had neither of these instruments previous to this study.

Twenty-four students at Western Michigan University served as a pilot group in developing Forms A and B. After revisions were made, the pretest was administered at Michigan State University to eighty-two enrollees in Principles of Clothing Construction (Textiles, Clothing and Related Arts 152). None of the participants had had a

a college course in clothing construction.

Validity of the course content and the answer key was established by selected groups of judges. Other authorities who contributed to the development and statistical analysis of the tests included experts in test construction, clothing construction, and educational research.

The coefficients of reliability for Form A (.734) and Form B (.732) were determined by the Analysis of Variance method. A correlation coefficient of +.70 indicated a marked relationship between the two forms of the pretest which had been judged reliable.

Validity of the two test forms, using the final course grade as the criterion, was determined by the Pearson Product-Moment formula. Coefficients of +.52 for Form A and +.50 for Form B indicated some degree of validity. Correlations were higher when application items were included in the computations than when only understanding items were used.

The experience questionnaire was judged helpful to the instructors in gaining insight into their students' backgrounds. Correlations were low between the student's opinion of her ability and her final course grade and between student's grade on the dress made as a class project and the number of dresses she had constructed previously. Neither coefficient was high enough to be considered significant.

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CHAPTER I

INTRODUCTION

In recent years the number of students enrolling in colleges and universities has increased tremendously. According to the Forty-Second Annual School and Society Enrollment Study,[1] matriculation at institutions of higher education during the past nine years has increased significantly. Total enrollment for 1961-1962 alone showed an increase of 6.6 per cent over the 1960-1961 figure.

Coupled with the increasing enrollments is the growing importance and need for adequate testing programs. In addition to general admissions tests, many programs are including tests to measure proficiency in specific areas of learning. Lindquist[2] expressed the viewpoint that admissions and achievement tests are intended for wide-scale use and that they emphasize general objectives, whereas tests intended to measure specific objectives of instruction should be constructed locally to fit the local course of study. Although

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[1]Garland G. Parker, "Statistics of Attendance in American Universities and Collages: 1961-1962," School and Society, XC (January 13, 1962), 5-21.

[2]E. F. Lindquist (ed.), Educational Measurement (Washington, D. C.: American Council on Education, 1951), p. 121.

certain tests are designed to emphasize factual information, the trend is toward measuring understanding and ability to apply to new situations the skills and principles involved. Even though the latter area is more difficult to evaluate, it is of greater interest, especially at the college level.[3]

A pretest is one type of technique used to measure achievement. Pretests are administered prior to formal instruction and may provide educators with information concerning student abilities, interests, attitudes, goals, and preparation for certain courses. Knowledge of student strengths and weaknesses prior to instruction provides educators with a basis for better meeting specific needs and for confronting students with challenging experiences.

This study is concerned with one constituent of the evaluation program: a pretest of selected knowledge in the area of clothing construction.

Purpose

At the college level a new approach to the teaching of clothing construction emphasizes student ability to understand and interpret clothing construction principles[4] as a foundation for problem solving. This approach is being

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[3]Paul R. Anderson et al., College Testing (Washington, D. C.: American Council on Education, 1955), p. 7.

[4]The specific principles of clothing construction which are relevant to the present study appear on pages 6 and 7.

tried on an experimental basis at Michigan State University. The purpose of this study is to develop a paper and pencil examination which could be used as a pretest of student ability to understand and apply these principles. In addition, an attempt will be made to develop an experience questionnaire to obtain data concerning student clothing construction experience prior to college enrollment.

Need

After observing classes in the Michigan State University course entitled Principles of Clothing Construction (Textiles, Clothing, and Related Arts 152) and discussing clothing construction problems with the students, the writer became aware of the heterogeneity of student backgrounds, interests, and attitudes in relation to clothing construction. Some students seemed better equipped than others to grasp and utilize course instruction. It was felt that a need existed for determining levels of ability in order to provide optimum learning experiences for all.

According to Arny,[5] "unless present status is known, neither teachers nor students can see what changes need to be made or are able to plan what instruction should be given to bring about these changes." Educators advocate that students be enrolled in courses which neither duplicate earlier learned materials nor challenge the student beyond his capacity.

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[5]Clara Brown Arny, Evaluation in Home Economics (New York: Appleton-Century-Crofts, Inc.,1953), p. 26.

Knowledge of individual differences can be utilized in a number of ways. In a broad sense it can serve to further the course objectives. Predetermined working knowledge variants could be compensated by adjustment or intensification of course content and methods, even though the course objectives remain identical for all. On the basis of pretest scores students could be placed in laboratory sections representing different degrees of attainment so that instruction could proceed at the level appropriate to the capacity of the group. Guidance of students to projects in which they could be presented with challenging learning experiences could be more effective if information concerning their level of readiness were available to instructors. In some instances it might be desirable to exempt exceptional students from beginning courses. Pretest data could serve as one basis for accelerating outstanding students to more difficult and challenging experiences.

Various colleges and universities have evaluation devices designed for use in their local college clothing construction courses. A review of several of these tests indicated that few are concerned with specific principles of clothing construction. The review of literature also indicated that there are no satisfactory standardized instruments to test knowledge of principles of clothing construction. The lack of standardized tests in home economics and clothing construction may be explained by the

fact that the practice of adapting home economics instruction to the interests and needs of individual students may interfere with the widespread use of any particular test.[6] Due to the shift in emphasis from facts to principles in college clothing construction courses and also to the lack of a pretest in clothing construction at Michigan State University, this study was undertaken.

Assumptions

The four assumptions basic to the study are:

1. Abilities of students can be predetermined.
2. The range of abilities among students varies.
3. A pretest provides an adequate sample of student reactions to situations in which course principles and objectives may be expressed.[7]
4. Principles of Clothing Construction (TCRA 152) provides the general background of principles and knowledge needed for subsequent courses.

Scope

The scope of this study involves two of the desirable competencies expected to be exhibited by TCRA 152 students: it includes the evaluation of student ability to understand principles and ability to apply principles of clothing construction. It, however, excludes achievement in manipulative

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[6]Ivol Spafford, Fundamentals in Teaching Home Economics (2d ed.; New York: John Wiley & Sons, Inc., 1954), p. 224.

[7]Ralph W. Tyler, Constructing Achievement Tests (Columbus: Ohio State University, 1934), p. 61.

skills. This study is based on the three course objectives and four course principles which have been developed for Principles of Clothing Construction (TCRA 152) at Michigan State University.[8] The three objectives are:

1. Students should gain an understanding of basic principles fundamental to all aspects of clothing construction and an ability to apply them.

2. Students should develop an understanding of processes and techniques of clothing construction and learn to evaluate them for specific end uses.

3. Students should develop an ability to recognize and/or appreciate standards of clothing construction.

The four principles and their associated corollaries are:

1. Shaping flat fabric to conform to body curves requires reducing the perimeter of garment pieces,

   Corollary I: The amount of reduction of the perimeter of garment pieces is relative to the degree of prominence of body curves.

   Corollary II: Darts, tucks, gathers, and ease radiate from the most prominent body curves to be covered by a given garment piece.

2. When concentric circles or arcs of different radii are used in clothing construction, certain adjustments in the circumferences are necessary.

3. Manipulation of any given material is dependent upon its component parts.

   Corollary I: Structure is a determinant of the extensibility of fabric.

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[8]Elizabeth H. Stewartson, "An Experimental Approach to the Teaching of Beginning Clothing Construction" (unfinished Master's thesis, Michigan State University, expected to be completed in August, 1962).

Corollary II: Texture is a determinant of the behavior of fabric.

4. Choice of construction methods and techniques and choice of fabric are interrelated.

Samples

Samples for the present study were selected and divided into two groups; those who responded to the pilot test and those who responded to the pretest. Freshman home economics students at Western Michigan University during the 1961-1962 school year who had not yet been enrolled in a college clothing construction course were selected for the item analyses of the pilot study. The sample for the pretest consisted of students enrolled in Principles of Clothing Construction (TCRA 152) at Michigan State University Spring Term, 1962. None of the respondents had been exposed to previous college clothing construction training.

Instrument Development

Multiple-choice and matching items were used in the pilot test and the pretest because, according to Crawford and Burnham,[9] multiple-choice, matching, and logical inference procedures readily lend themselves to the measurement of complex thought processes. These methods were selected in an attempt to determine student levels of ability to solve problems using underlying principles of clothing construction.

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[9]Paul S. Burnham and Albert B. Crawford, Forecasting College Achievement (New Haven: Yale University Press, 1946), p. 105.

Definition of Terms

The following is an explanation of terms[10] generally applied during the construction of pretests and other evaluation instruments. These definitions are presented to clarify any misconceptions which may arise due to wording or the meaning of specific technical terms.

Correlation--the relationship between two variables or two sets of measures for the same groups of individuals. An absence of relationship is denoted by .00 while the presence of a positive or negative correlation is denoted by +1.00 or -1.00, respectively.

Discriminating Item--a test item which differentiates between persons in which some trait is more greatly or relatively less pronounced.

Equivalent Forms--two or more forms of a test that are so closely alike in terms of their item difficulty and the functions they measure that they yield similar average scores and the same dispersion of scores.

Evaluation--the quantitative measurement and qualitative appraisal of a comprehensive range of objectives, defined in terms of pupil behavior, via a variety of techniques.

Item Analysis--the process of determining the validity of a test item, considering the difficulty level and the discriminating power of each test item.

Item Difficulty--a measure of the proportion of a given group which answers a test item correctly.

Mean--a measure of central tendency indicating the arithmetic average of a distribution of test scores.

Measurement--the quantitative appraisal of educational objectives, usually by means of some device.

Median--the score which divides test scores in a frequency distribution into two equal parts.

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[10]Adapted from Joseph Justman, Irving Robbins, and J. Wayne Wrightstone, Evaluation in Modern Education (New York: American Book Co., 1956).

Mode--the score which occurs most frequently in a distribution of scores.

Reliability--the degree of consistency with which a test measures whatever, if anything, it does measure.

Split-Halve Reliability--the correlation between the score on one-half of a test and the score on the other half of the test, with the appropriate Spearman-Brown correction.

Standardized Tests--tests which sample the performance of an individual or a group under prescribed conditions and which are scored according to stated rules and interpreted by reference to normative data.

Validity--the extent to which a test actually tests whatever it was intended to test.

CHAPTER II

REVIEW OF LITERATURE

Evidences of early testing devices, although crude in comparison to present-day techniques, are recorded in ancient literature. The story of the first objective test appears in the Old Testament (Judges, 12:5-7).[11] The Gileadites examined the tribes who wished to cross the Jordon by asking them to pronounce correctly the word "Shibboleth." The enemy Ephraimites could respond only with "Siboleth"; consequently 42,000 of their number were killed. Another form of oral examination was exemplified by Socrates when he subjected his students to comprehensive oral quizzing. In spite of the evidence indicating that testing began hundreds of years ago, the modern concepts of testing programs for assessing student growth and development have evolved from research done within the short span of the past sixty-five years.

Scates[12] who traced the development of modern measurement and evaluation concepts by decades, found that the

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[11]Norma V. Scheidemann, "The Earliest Recorded Objective Test," School and Society, XXIX (June 1, 1929), 702.

[12]Douglas E. Scates, "Fifty Years of Objective Measurement and Research in Education," Journal of Educational Research, XLI (December, 1947), 241-264.

first contributions were made from 1897 to 1906. This first decade was marked by Joseph M. Rice's test of spelling, by experimentation on the Binet intelligence scale, and by achievement testing for the basic skills of arithmetic and language arts. New concepts of testing introduced by Thorndike during the second decade related to objective scoring, items scaled according to difficulty, and statistical determination of norms for achievement tests. During the third decade, statistical techniques ccntinued to be developed until they could be applied to test analysis. Group intelligence tests for children patterned after those used in World War I and achievement test batteries published for purchase by school systems appeared during the 1920's. Notable advances during the fourth decade were the formulation of methods and techniques for measuring and evaluating attitudes, interests, powers of thinking, and personal-social adaptability plus measures of achievement and intelligence. In that decade, the concept of evaluation was given impetus by Ralph W. Tyler and the Eight-Year Study, in which broader sets of objectives, such as personal characteristics and response tendencies, were measured. Evaluation devices introduced in the fourth decade and refined in the fifth decade included personality tests, projective techniques, interest inventories, attitude scales, and anecdotal records.

Purposes of Evaluation Instruments

In more recent years testing programs have become concerned with functional learning outcomes, with emphasis being shifted from the measurement of isolated skills, facts, and abilities to the measurement of understanding and interpretation. Huston[13] reported an early experimental measurement program conducted by the School of Home Economics at Ohio State University from 1931 to 1935. This program was an important innovation, as it emphasized the specific teaching objectives of desirable behavior rather than the mere importation of subject matter. The Ohio State University experiment was the first attempt to test for understanding and application of principles in home economics.

The early studies of the prediction of academic success in high school and college were concerned mainly with predictions using over-all scholastic aptitude measures.[14] It has been found that tests which are designed for specific courses provide more accurate predictions than tests which have broader purposes. Greater progress in pretesting, however, has been made in fields other than home economics, particularly at the elementary school level, in trades, and in industry.[15]

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[13]Hazel H. Huston, "Measuring Achievement in Home Economics," Journal of Home Economics, XXIX (January, 1937), 19-22.

[14]Robert M. W. Travers, Educational Measurement (New York: The Macmillan Co., 1955), p. 391.

[15]Arny, op. cit., p. 11.

A survey of the literature revealed that most home economics tests have been designed to cover specific areas rather than to encompass the entire field. Among the instruments developed have been scales for measuring sewing ability, check lists for determining the quality of the foods prepared by students, and tests in household management, foods, and house design and home furnishings.

A number of colleges and universities are currently administering objective pretests to their freshman enrollees in clothing construction. These objective tests are serving as important tools for student placement and grouping, for guiding students into worth-while learning experiences, and for planning course instruction.

(Objective tests, according to Dr. J. Raymond Gerberich, are the most reliable instruments available for measuring the complex aspects of student behavior in which administrators and instructors are becoming increasingly interested.[16] Gerberich's statement supports, in part, several of the pretesting devices used in the studies which are reviewed in the following paragraphs.)

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[16]Robert L. Ebel, "Inventories and Tests," Education, LXXXI(October, 1960), 75. Ebel's article summarizes a discussion by six leading experts in theory and techniques of testing. Dr. J. Raymond Gerberich was one of the authorities who discussed the effects of widespread objective testing.

Studies Related to Evaluation in Clothing Construction

The first pretest in clothing construction, developed by Saddler[17] at Iowa State College in 1945, was designed to section students into homogeneous groups. This test battery was composed of a Paper-and-Pencil Section to determine the acquisition of information and a Practical Section to test sewing ability. In addition, an experience score was obtained by having each student list the number of garments she had made. Weightings were then assigned to garments which had been made under supervision, and the various findings were formed into a total score.

High coefficients of reliability showed that both sections of the Saddler test were internally consistent. The Paper-and-Pencil-Section and the Practical Section had coefficients of reliability of .843 and .881, respectively. A correlation of scores on the two sections yielded a coefficient of +.669. The split-score method and the Spearman-Brown formula were used. The coefficient of correlation of +.45 between the experience scores and teacher sectioning was too low to be valid for predictive purposes. Regression equations were developed to determine which test factor or combination of factors would be best for predicting achievement in elementary clothing construction.

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[17]Jane Saddler, "Placement Test for College Home Economics Students: I. Elementary Clothing Construction" (unpublished Master's thesis, Iowa State College, 1945).

Saddler concluded from her findings that:

1. Both sections of the placement test were sufficiently reliable to use in helping to place students in elementary clothing construction.

2. A different kind of behavior could be measured by each section of the placement test.

3. Better prediction could be made by using the Paper-and-Pencil Section of the placement test and the Practical Section of the placement test together than by using either section alone.

4. The addition of an experience score, as it was determined in the study, was of insufficient value to be useful for prediction.

She noted that the practical test was expensive and time-consuming to administer and was difficult to score.

In 1952 Patson[18] conducted a study to revise the Saddler test and increase its efficiency to meet the changes that had been made in the content and method of teaching the elementary clothing construction course at Iowa State College. Serving as a basis for revision were an item analysis of the Saddler Paper-and-Pencil Test for 175 girls who had taken the elementary clothing construction course and an analysis of the students' placement in each course section.

Using the final examination as the criterion, Patson found a correlation of +.402 between the Saddler Paper-and-Pencil Test and this criterion. This correlation, which was considerably lower than those computed by Saddler, was explained by Patson in several ways. She felt that some items

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[18]Nellie Katherine Patson, "Prediction of Construction Achievement Using Saddler Clothing Test, Dexterity

of good discriminating power were probably discarded because they no longer applied to the revised course. The discriminating power of some test items may have been lost in an attempt to clarify their meaning. Saddler's use of the teacher's judgment on the correctness of the placement of the student at the end of three weeks of instruction instead of the final examination as a criterion may have been another factor accounting for the lower correlation. Patson felt that various criteria should be studied to determine which one would give the most valid prediction.

Since the Saddler Test had not been revised in time to be administered at the first class meeting, Patson recommended that a further study be made under more favorable conditions. She further recommended that the effectiveness of the Revised Saddler Paper-and-Pencil Test be studied.

A third study of the Saddler Paper-and-Pencil Test was undertaken by Nieman in 1961.[19] In determining the effectiveness of the revised placement test, she selected as her criteria the final course grade, the instructor's opinion of the best placement of each student, and the student's opinion

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Questionnaire and Four Spatial Relations Test" (unpublished Master's thesis, Iowa State College, 1952).

[19]Mary Read Nieman, "Effectiveness of the Placement Test for Sectioning Students in the Elementary Clothing Construction Course" (unpublished Master's thesis, Iowa State University, 1961).

of her best placement. Data were collected from 234 elementary clothing construction students who were placed in sections X, Y, Z, and in an experimental Y group.

Nieman found a positive correlation between the Saddler Test and each of the criteria, indicating some degree of validity for classifying students. Intercorrelation among the criterion measures indicated that there was some agreement between the instructor's and student's opinion concerning correct placement of the student. The means of the X, Y, Z, and experimental Y groups showed considerable agreement between instructor and student opinion and correct placement between groups, although instructors tended to place students slightly lower than the students placed themselves.

Nieman recommended that the test battery, including the Saddler Paper-and-Pencil Test, should continue as a classification device for elementary clothing construction. She felt, however, that the Saddler Paper-and-Pencil Test could be weighted more highly in the formulas for classifying students in order to give better prediction.

Henkel and Seronsy[20] reported an experimental curriculum study at Purdue University where freshmen in an introductory course in Clothing and Textiles were divided into beginning and advanced groups for instructional purposes. The three devices which were administered prior to instruction and

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[20]Jean Henkel and Louise Baird Seronsy, "First Course in Clothing and Textiles," Journal of Home Economics, XLIII (March, 1951), 195-197.

used for placement purposes were: (1) The Home Economics Orientation Test in Clothing and Textiles, (2) Council on Education Psychological Examination, and (3) the Experience Checklist. The raw scores were converted to standard T-scores, with double weighting given to the achievement score on the orientation test. The final basis for placing students in either the advanced or the beginning section was the total T-score, which was obtained by adding all T-scores.

Correlations were obtained between course grades and each of the three devices used for sectioning students and between course grades and the total T-scores. Course grades were related to all factors except the score on the Experience Checklist. Henkel and Seronsy, therefore, deduced that achievement, as measured by a reliable test, is more basic to predicting course grades than is a score of previous clothing learning experiences.

During the last week of the experimental course "A Scale for Measuring Attitude Toward Any School Subject" by Ella B. Silance and H. H. Remmers was given to all students. The results were then compared with scores from the same scale which had been given to students in the non-sectioned introductory clothing course the previous year. The difference between the mean scores produced by the two types of classes was so great it could not have occurred by chance. It was concluded

that sectioning students into varied levels of training can produce favorable attitudes toward the course.

In another study at Purdue University, Wright and Henkel[21] attempted to determine the effect of past experience on achievement in a freshman clothing construction laboratory. The term "achievement" included the following three phases of learning: (1) knowledge, as measured by paper and pencil tests; (2) skill, as measured by actual sewing construction; and (3) attitudes, as measured by student opinions.

An instrument composed of multiple-choice, matching, and modified true-false items was developed to measure knowledge gained during the semester. The test was administered at the beginning and end of the semester course. The test was valid to the extent of +.54 correlation coefficient between the pretest score and the course grade. When the same test was administered at the close of the semester, a correlation coefficient of +.67 between the test score and the course grade resulted. A reliability coefficient of +.83 was calculated by the split-forms method and corrected to a +.91 by the Spearman-Brown Prophecy formula.

Wright and Henkel selected students for "advanced" and "intermediate" classes on the basis of desirable work done on the two-hour pretest administered during the orientation period for freshman students. These

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[21]Janet Smith Wright and Jean Henkel, "Achievement in Clothing Construction," Journal of Home Economics," XLIII (October, 1951), 626-628.

students were encouraged to select more difficult problems for the semester's work than was expected of the students who were placed in the "beginning" group.

Purdue University student attitudes toward the sectioned clothing construction course rated well above the indifference level measured on the Silance-Remmers Form A scale. In fact 92.1 per cent of the students favored divisioning students on the basis of previous construction experience. The correlation contingency between the course grade and the amount of previous experience was +.52 indicating there was correlation between freshman clothing construction course grades and the amount and type of previous experience. Wright and Henkel inferred that the amount of previous experience in clothing construction had a definite effect on the attitude and the achievement of the student. They also concluded that students whose selected field of specialization related to clothing when they entered the School of Home Economics did not show greater achievement in clothing construction than students who selected other areas.

At New Mexico State University in 1959, Hoskins[22] developed the first clothing pretest for use in several

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[22]Mercedes Nelson Hoskins, "Construction of a Basic Clothing Pretest for Use in the Colleges and Universities of New Mexico" (unpublished Master's thesis, New Mexico State University, 1959).

institutions. Aided by personnel in five colleges and universities in New Mexico, she formulated generalizations which may be taught in a first clothing construction course. Using the generalizations as a guide, she constructed a pretest to determine student level of understanding of basic clothing construction principles and to determine strengths and weaknesses of incoming freshman students in home economics. The principles involved were divided into three areas: (1) principles of arts applied to the complete costume, (2) principles of pre-construction processes, and (3) principles of construction processes. The test items were apportioned according to the amount of emphasis placed on each area by the five participating institutions of higher learning.

Hoskins included in the pilot study, students in high school vocational homemaking departments. Revision of the pretest was made on the basis of the pilot study and from the comments of a panel of critics.

The coefficient of correlation of the entire test using the Spearman-Rank-Difference Method was +.99. The coefficient of reliability using the Kuder-Richardson Formula 20 was .717. Since no extreme scores were obtained, Hoskins felt that the test was neither too easy nor too difficult.

Hoskins recommended that a practical test accompany

the written pretest. In addition to using the pretest for exemption purposes, she suggested that a written and a practical pretest could increase motivation in the students, could aid in placing students, and could serve to guide instructors in planning course work.

In 1961 Semeniuk[23] planned an objective pretest-retest for classification of freshmen in beginning clothing construction at South Dakota State College. In addition she devised a questionnaire to gain information about the kind and amount of sewing experience students had had and about their attitude toward sewing.

The pretest tested for facts and principles or generalizations in five subject matter areas. Fifty-seven of the 116 items were non-discriminating, having index values of less than 15 per cent. The reliability coefficient of .69 for the entire pretest was derived by the Spearman-Brown Conversion Formula. The correlation coefficient between the pretest scores and the scores on the retest of the pretest given toward the end of the term was +.53. Semeniuk considered the pretest valid to some degree in reflecting past clothing experience and subsequent performance in the course. The correlation coefficient between the pretest score and the garment grade was +.42 while it was +.52 between the pretest score and the final grade.

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[23]Alexandra O. Semeniuk, "A Pretest and Questionnaire to Determine Student Levels of Achievement Prior to Enrollment in a Beginning Clothing Construction Course at South Dakota State College" (unpublished Master's thesis, South Dakota State College, 1961).

Semeniuk recommended that the test items be scrutinized and arranged in order of difficulty. She suggested that a practical test be given with the written pretest if sectioning of students were to be feasible

The revision of the written placement test at Oklahoma State University and the development of additional devices for evaluating selected clothing competencies of college freshmen were the major problems in the study completed by Witt[24] in 1961. The four competencies appraised were: (1) student ability to apply principles in the selection and construction of clothing; (2) student knowledge of the selection, construction, and care of clothing; (3) student level of achievement in using manipulative skills in the construction of clothing; and (4) student level of achievement in using judgmental skills in the selection and construction of clothing. All participants were freshmen clothing students at Oklahoma State University and Mississippi State College for Women in 1960-1961.

Witt formulated a questionnaire-check list and administered it to a pilot group of 30 students. After revision, the questionnaire-check list was checked by 112 students whose responses revealed their varied clothing experience and supported the need for clothing placement devices. The

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[24]Mildred Rea Witt, "The Revision and Development of Selected Evaluation Devices for Appraising Certain Clothing Competencies of College Freshmen" (unpublished Ph.D. dissertation, Oklahoma State University, 1961).

placement test was revised on the basis of an item analysis of responses to the Oklahoma State University Clothing Pre-test given to freshman clothing enrollees, Fall Semester, 1960.

The coefficient of reliability of .74 was determined for the written test using the Kuder-Richardson Formula 20. The validity of the evaluation devices was determined by the judgment of the test constructor and a selected group of judges. The correlation between scores on items concerning students' knowledge of clothing selection, care, and construction and scores on items assessing students' ability to apply principles was +.16. The correlation of these competencies implies that a high score on one competency does not necessarily mean a student will receive a similar score on another competency. The wide range of test scores and an analysis of the responses to the individual items on the written test indicated a definite need for determining a satisfactory method of placing students in order that they might be properly challenged.

Witt felt that the test items would have been more discriminating if time had been allowed for a pilot study. She recommended that further studies be conducted to improve the evaluation devices and that the non-discriminating and free-response items be eliminated from the test, while more items requiring students to apply principles be added.

From a review of the literature concerning pretests designed for beginning clothing construction courses, the following conclusions appear to be warranted:

1. Most pretests which have been designed for beginning clothing construction courses measure the objectives of clothing construction in one institution of higher learning.

2. Pretests should be scrutinized and revised periodically so they will measure adequately the current course objectives and principles.

3. Pretests can be used by institutions of higher learning to exempt exceptional students from a beginning course, to place students in courses of an appropriate level, and to guide curriculum planning.

4. Sectioning students into classes of various levels of training promotes a better attitude toward clothing construction and higher achievement and interest in the course.

5. Pretests should measure the extent to which a student can solve new problems in clothing construction.

6. Pretests should include a measure of student manipulative skills to determine the extent to which the student can use clothing construction techniques.

CHAPTER III

PROCEDURE

Preliminary Step

A review of literature was essential to this study to determine the type, amount, and findings of research which had previously been done in the field of measurement and evaluation designed for clothing construction courses at the college level. A study was made of tests from other institutions of higher learning in an effort to assess efficient and effective means of pretesting students' abilities in clothing construction. It was hoped that inadequacies, as pointed out by other researchers, could be reduced in the proposed tests and that the positive characteristics of other tests might be incorporated in the clothing construction pretest at Michigan State University.

Differentiation Between Pilot Test and Pretest

The pilot study is one phase in the construction of educational tests and measurements in which a test is tried out in its preliminary form. This try-out test, or pilot test, as it is named in this study, is given in order to locate as many defects as possible before the final form is assembled and administered.

The pretest in this investigation is the pilot test in its final form. The items which are placed on the pretest have been submitted to analysis and revision on the basis of the results of the pilot test. It is expected that a pretest would be a better evaluation instrument than a pilot test, since several inadequacies in the performance of the pilot test have been removed.

Development of the Pilot Test

The initial step in the development of the pilot test was the establishment of the course content for Principles of Clothing Construction (TCRA 152) which was founded on the understanding and application of four principles of clothing construction. A check list[25] of topics of instruction was formulated and presented to clothing instructors at Michigan State University for confirmation, deletions, and/or additions. The results of the check list were tabulated to determine the extent of the confirmation in identification of topical areas for evaluation.

The confirmed list of course content topics served as a basis for test item construction. In addition, an attempt was made to develop approximately 50 per cent of the items to test for application of principles and 50 per cent of the items to test for understanding of principles. A proportionate number (see Table 1) of the understanding and application questions were related to each of the four principles of

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[25]See Appendix A, p. 54, for a copy of the check list.

clothing construction[26] and included only areas of course content deemed apropos by the faculty members. After one complete set of questions was formulated, equivalent questions were written. All items were then examined by one expert in test construction and one expert in clothing construction. Items were either revised, rewritten, or discarded on the basis of the comments of the two experts.

TABLE 1

THE PROPORTION OF ITEMS RELATED TO EACH OF THE FOUR PRINCIPLES OF CLOTHING CONSTRUCTION

Principle	Percentage of Items Related to Each Principle	
	Form A	Form B
I. Shaping flat fabric to conform to body curves requires reducing the perimeter of garment pieces	12.79	13.92
II. When concentric circles or arcs of different radii are used in clothing construction, certain adjustments in the circumferences are necessary.	10.47	8.86
III. Manipulation of any given material is dependent upon its component parts.	16.28	15.19
IV. Choice of construction methods and techniques and choice of fabric are interrelated.	60.46	62.03

[26]See Appendix B, p. 57.

The equivalent test items were divided into two tests, Forms A and B, so that not all of the original questions would appear on the same form. Of the 86 items on Form A there were 41 multiple-choice items and 45 matching items. The 79 items on Form B consisted of 47 multiple-choice items and 32 matching items. The answer sheet was constructed so that each multiple-choice item and each part of the matching items would be considered as a separate item. All questions were numbered consecutively to minimize the chances of respondent confusion.

The Sample of the Pilot Test

In preparation for the pilot study, a sample was selected from five Michigan colleges and universities. Michigan State University students were excluded from the pilot study. This was done to eliminate a possible source of bias due to prior exposure and feedback in the Michigan State University sample. Letters of inquiry[27] were sent to Albion College, Central Michigan University, Eastern Michigan University, Wayne State University, and Western Michigan University asking their cooperation in administering the pilot test. All but one institution replied, but due to course scheduling only Western Michigan University could arrange for administration of the pilot test.

Administration and Analysis of the Pilot Test

The pilot test, consisting of Form A and Form B, was administered to 24 home economics freshmen who had not

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[27]See Appendix C, p.59, for an example of the letter.

previously taken a college clothing construction course. Fifty minutes was allotted the students for writing each test form with a ten minute break given between the administration of the two forms of the pilot test. Due to differences in opinion concerning the correct answers to the test items, a panel of three judges served as the final authority.

Since there was a small number of participants in the pilot study, the statistical analysis was limited in scope. Two of the participants were omitted from the statistical analysis, since they did not respond to all of the items. The coefficients of reliability using the Analysis of Variance method were obtained for Forms A and B. To determine the basis for estimating the discrepancy between the obtained variance and the true variance, the "among students" and "among items" sums of squares were subtracted from the total sum of squares. Hoyt feels that the analysis of variance estimate "is better than the split-halves method because the particular way of splitting the test may be an unlucky division and result in either an overestimate or an underestimate of the true coefficient of reliability."[28] The Analysis of Variance formula[29] is:

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[28]Cyril Hoyt, "Test Reliability Estimated by Analysis of Variance," Psychometrika, VI (June, 1941), 155.

[29]Ibid.

$$r_{tt} = \frac{S^2_R - S^2_E}{S^2_R}$$

where, S^2_R = variance among individuals

S^2_E = error variance.

The coefficient of correlation between Form A and Form B was obtained by the Pearson Product-Moment Formula. This method is useful with ungrouped data and does not require the use of deviations to determine the relevance of the relationship between the two measures.[30]

The Pearson Product-Moment Formula[31] is:

$$r_{xy} = \frac{N\Sigma XY - (\Sigma X)(\Sigma Y)}{\sqrt{[N\Sigma X^2 - (\Sigma X)^2][N\Sigma Y^2 - (\Sigma Y)^2]}}$$

where, N = number of cases

X and Y = original scores on Form A and Form B.

The item difficulty indices were derived by computing the percentage of students who had responded correctly to each item.[32]

Test items which showed a very low or very high difficulty index on the pilot test were revised, but none were discarded. After the revised items were examined by a test

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[30]J. P. Guilford, Fundamental Statistics in Psychology and Education (3d ed.; New York: McGraw-Hill Book Co., Inc., 1956), p. 140.

[31]Ibid.

[32]Paul L. Dressel and Associates, Evaluation in Higher Education (Boston: Houghton Mifflin Co., 1961), p. 450.

construction expert and a clothing construction expert, the pretest was compiled into Form A and Form B[33] similar to those forms in the pilot test.

The Experience Questionnaire

The experience questionnaire[34] was formulated to determine the clothing construction background of each student and the student's opinion of her level of ability at the time she enrolled in TCRA 152. Knowledge of the types of garments students had made and the media of instruction should help the instructors understand student progress and/or deficiencies in the course. Explanations were included with the classification of level of ability to obtain a more valid interpretation of student opinions.

The student ratings of their ability to understand and apply the principles of clothing construction and their final course grade were correlated by the Pearson Product-Moment formula.[35] This was done to determine if student opinions of their own ability were related to their final course grade.

Since the dress project for the course was done independently of the classroom, the dress scores were correlated with the number of dresses the students had made prior to the course instruction. This procedure was undertaken to determine if the number of dresses made had any effect on the grade received

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[33]See Appendix D, for a copy of Form A and a copy of Form B, pp. 61 and 74, respectively.

[34]See Appendix E, for a copy of the experience questionnaire, p. 86.

[35]See page 31.

on the dress project. Again the Pearson Product-Moment formula[36] was employed.

Keying the Test Items

Six instructors who were currently teaching TCRA 152 served as judges for the correct answer key. Each instructor was supplied with a copy of Form A and Form B and an answer sheet on which she indicated her choice of the correct answer for each test item. When questions concerning the test items or the correct answer arose, the instructors noted these on the answer sheet. The answers were tabulated and at least 50 per cent agreement was necessary to validate an answer. In some cases when agreement did not reach 50 per cent, multiple answers were used in correcting the respondents' answer sheets.

Administration and Analysis of the Pretest

The pretest was administered to 82 enrollees in TCRA 152 at Michigan State University during the first laboratory class Spring Term, 1962. All five sections were given exactly the same instructions for the pretest when administered by the researcher. Fifty minutes were allowed for writing each form of the test. A ten minute relaxation period was provided between the administration of Form A and Form B. The experience questionnaire was given after the students had completed Form A of the pretest but before they

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[36] Ibid.

were given the relaxation break.

A more detailed statistical analysis was possible with the pretest than with the pilot test because of the greater number (241.66 per cent more) of subjects involved in the pretest. The item analysis included the determination of the item difficulty and item discrimination indices. The item difficulty indices were obtained by the same method that was used for the pilot test.[37] The difference in the proportion of students in the upper 27 per cent and the lower 27 per cent who answered an item correctly constituted the item discrimination indices.[38]

The criterion, or independent measure of a characteristic, for validation of Forms A and B was the students' grade in the course. Validation was accomplished by comparing the criterion with the students' (1) understanding scores, (2) application scores, and (3) total scores on each form of the pretest. These correlations were intended to measure the relevance, or relationship, between the scores on the test and the actual trait which the test was designed to measure. Utilizing the students' original score, the Pearson Product-Moment method[39] was employed to obtain the coefficients of correlation.

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[37] See page 31.

[38] Dressel, op. cit., p. 450.

[39] See page 31.

Reliability was also considered in the validation of the test, as it places a ceiling on the possible validity of a test. In other words, a test can be expected to measure what it was designed to measure only to the extent that it is a consistent measure.

CHAPTER IV

FINDINGS

The Pilot Test

Analysis of the pilot test was based on the responses of 22 students. The failure of two students to complete all of the items may have been due to disinterest. However, failure to respond could not have been due to lack of time. The fifty minute time limitation for each form was found sufficient, since all students had completed and turned in Form A in 45 minutes and Form B in 35 minutes. The possibility that the two partial respondents did not know the answers to the omitted items was also discounted, as the researcher gave explicit directions prior to the administration of the test for students to answer each item even though their answer might be a guess.

Several items were duplicated on Forms A and B. Because of the duplication of items and because Form A contained more items than Form B, the duplicated items were omitted from Form A for the statistical analysis.

Individual scores on the 86-item Form A ranged from 58 to 32. On Form B the high score was 54 while the low score was 28 with the total possible score being 79. The mean and median scores on Form A were 44.1 and 43.0, respectively.

The mean score on Form B was 43.5 and the median score was 43.0. The facts that the range was fairly small and that the scores clustered toward the middle of the range might lessen the desirability of the two tests as predictive instruments.

The coefficients of reliability for Form A and Form B were .58 and .55, respectively. The coefficient of correlation between Forms A and B was +.52. These figures are not sufficiently high to indicate that the tests are either comparable or consistent measures of student ability to understand and apply the principles of clothing construction.

In the item difficulty indices, 58.20 per cent of the items on Form A and 48.01 per cent of the items on Form B did not fall within the prescribed 30 to 70 per cent difficulty range. The large percentage of items not within the desired range may be one explanation for the low reliability and correlation coefficients. The indication that items were too difficult or too easy meant that they must be examined and revised or rewritten.

Due to the small number of respondents in the sample, an examination of the item discriminating power was not feasible. In addition, findings from a small sample should not be considered highly significant.

The Pretest

Response.--The number of respondents who supplied data for the pretest was 82. Although the number of items on

Form A was 86 and the number of items on Form B was 79, the scores on both forms ranged from 60 to 24. The mean scores on Forms A and B were 44.06 and 41.91, respectively, while the median scores were 44 for Form A and 42 for Form B. The scores were not affected by non-respondents, as all students completed each form within the fifty minute time allotment. All students had responded to the items and checked their answers on Form A in 47 minutes and on Form B in 40 minutes.

Test Key.--One hundred per cent agreement among the judges on the correct answers to the test items was obtained for 43.35 per cent of the Form A questions[40] and 44.28 per cent of the Form B questions.[41] All but one judge agreed on 25.58 per cent and 22.78 per cent of the questions on Form A and Form B, respectively. Lack of one hundred per cent agreement on several of these items was due to the judges' choice of two rather than one best answer.

Lack of response to an item may have been due to the item being confusing to the judge. The judge may also have skipped an item with the intent of going back to answer it but for some reason have forgotten to respond.

The lack of at least 50 per cent agreement of a correct answer or the judges' choices of multiple answers may indicate a poorly written, confusing, or controversial question.

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[40] See Appendix F, p. 87.

[41] See Appendix G, p. 90.

Because of differences in the judges' training and opinions concerning certain processes in clothing construction, some multiple answers were expected.

Item Difficulty.--The percentage of items on Form A which appeared above and below the 30 to 70 per cent difficulty level was 38.37 per cent. On Form B the percentage was 43.04 per cent. A comparison of the difficulty indices of the equivalent questions[42] showed that 24 of the items which were too easy or too difficult on one form were not on the other form.

Due to the memory factor, there was some expectation that the difficulty indices of the duplicated questions would be lower on Form A than on Form B, since Form A was administered first. This expectation did not appear to be entirely sound, since 46.66 per cent of the duplicate items rated a higher rather than lower difficulty index on Form A. These results may be attributed to guessing the correct answers, particularly because the pretest was concerned with material unfamiliar to the respondents.

Item Discrimination.--High discrimination indices are desirable for predictive testing. Items with a discrimination index of less than .20 may be ambiguous or unclear, or they may be affected by a contestible keyed answer.

Examination of the discrimination indices[43] revealed that 6 items on Form A and 5 items on Form B should be

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[42]See Appendix H, p. 93. [43]See Appendix I, p.95.

eliminated from the test. These items showed either a negative or a zero index figure indicating that the lower 27 per cent of those tested were responding as well as or better than the upper 27 per cent of the group tested. The six non-discriminating items on Form A were not duplicate items. If the non-discriminating items on Form A had been items duplicated on Form B, they would automatically be eliminated in subsequent statistical data.

The items on both forms which had item discrimination indices of .01 to .20 discriminate only to a small degree. These items do not have to be eliminated from the test, but they must be examined carefully before being used for further predictive testing. If it had been possible to calculate item discrimination indices for the pilot test, the number (24 on Form A and 28 on Form B) of slightly discriminating items probably would have been reduced.

Reliability.--Four students who took the pretest did not complete the course, so their scores were omitted from the reliability computations. In addition, all non-discriminating items on both forms and all duplicate items on Form A were not included in the data.

The coefficients of reliability were .734 on Form A and .732 on Form B. A reliability coefficient of at least .80 is desirable. However, a test showing a slightly lower reliability may be used with caution consistent with the

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[43]See Appendix I, p. 95.

margin of error involved.[44]

The reliability of the two test forms may be affected by the fact that several of the items have low discrimination indices. These questions, even though they discriminate to a small degree, may be discriminating because of chance.

The wide range of difficulty of items may have been one cause for the reliability of the test to be below .80. The percentage of difficulty of items on Form A ranged from 06.0 per cent to 93.9 per cent. On Form B, the percentages of difficulty ranged from 06.0 to 97.5 per cent. Items which very few individuals can pass or which nearly all individuals can pass can do little to alter the discrimination indices and as a consequence there can be no significant change in the reliability of the test.

Pretest scores on each form were identified by three categories: (1) understanding of principles score, (2) application of principles score, and (3) total score. The correlation coefficient (see Table 2) showing the degree of relationship between the understanding sections of Forms A and B was +.53. The coefficient for the application sections of Form A and Form B was +.70 and for the total test scores, +.72. Guilford[45] interprets the strength of relationship for correlation coefficients equal to .40 to .70 as showing

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[44]Guilford, op. cit., p. 146.

[45]Ibid., p. 145.

moderate correlation and substantial relationship. A high correlation with marked relationship is shown by correlation coefficients equal to .70 to .90. Correlation coefficients equal to .90 to 1.00 can be described as showing very high correlation and very dependable relationship.

TABLE 2

THE STRENGTH OF RELATIONSHIP BETWEEN EACH CATEGORY IN THE PRETEST

Category	Correlation Coefficient	Explanation of Strength of Relationship
Understanding of Principle Score	+ .53	Moderate correlation, substantial relationship
Application of Principle Score	+ .70	High correlation, marked relationship
Total Score	+ .72	High correlation, marked relationship

Forms A and B, as equivalent forms, were found to be reliable enough to be useful. However, they could not be considered highly reliable tests. There was a marked relationship between the total test and between the application sections of the tests. The understanding sections of the test correlated to a lesser degree than did the total test or application sections. The understanding sections showed a moderate correlation and substantial relationship.

Authorities feel that students may be able to apply knowledge without understanding the application. This

contention seems to explain higher correlations on tests of application of principles and on tests containing application items than on tests of understanding of principles. The understanding scores may be composed of a number of guesses which would be likely to decrease the correlation between Form A and Form B. On the other hand, since students may have been more certain of the answers to the application items, students are expected to be more consistent in their selection of answers to equivalent items on Forms A and B. As a result a higher correlation coefficient would be expected on the application sections or entire test than on the understanding sections of the pretest.

Validity.--In order to determine the validity coefficients, the final course grade was used as the criterion. The numerical weightings given to the letter grades were: A = 4, B = 3, C = 2, and D = 1. No F grades were received as final course grades.

The correlation coefficient (see Table 3) between the understanding items on Form A and the criterion was +.51, between the application questions on Form A and the criterion was +.52, and between the total Form A scores and the criterion was +.55. The correlation coefficients on Form B between the understanding, application, and total scores and the criterion were +.39, +.50, and +.45, respectively. Validity coefficients commonly ranged from .30 to .80. However, for tests for guidance or selection purposes the coefficients

should be at least .45 for material usefulness.[46]

TABLE 3

STRENGTH OF RELATIONSHIP BETWEEN THE CRITERION AND EACH CATEGORY OF THE PRETEST

Category	Correlation Coefficient	Strength of Relationship
Understanding--Form A	+ .51	Satisfactory but not highly desirable
Application--Form A	+ .52	Satisfactory but not highly desirable
Total--Form A	+ .55	Satisfactory but not highly desirable
Understanding--Form B	+ .39	Unsatisfactory
Application--Form B	+ .50	Satisfactory but not highly desirable
Total--Form B	+ .45	Satisfactory but of minimal desirability

The test validity may be affected by the need for multiple answers to some of the test items. When several answers are appropriate, the chances that an answer is a guess is increased; therefore, the item does not provide a true test of the knowledge involved.

The fact that the criterion contains some degree of judgment of students' skill may affect test validity. The understanding and application of principles of clothing

[46]Guilford, op. cit., p. 146.

construction could not be segregated from the credit given for skills in the final course grade. In effect the criterion of grade in the course was not a measure of exactly the same thing the pretest was designed to measure. However, the course grade was the closest criterion measure available at this time.

The validity of the pretest may have been affected by the fact that the test was not of sufficient length to necessitate use of the entire time limitation for students to respond to all items. Generally, validity can be increased for the majority of the scores by increasing the length of the instrument and not lengthening the time.[47]

Form A proved to be more valid than Form B. Form A was considered moderately valid since the coefficient of validity for the entire test was at the mid-point of the common validity coefficient range. Form B, on the other hand, was materially useful but could not be considered as having desirable validity. The recall of certain items on Form A may have given incorrect clues to items on Form B. As a result the validity of Form B could have been altered.

The Experience Questionnaire

Students were asked on the Experience Questionnaire[48] to list and categorize the number of garments they had constructed prior to the course and to judge their ability in

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[47]Lindquist, op. cit., p. 337.

[48]See Appendix E, p. 86.

clothing construction. The ability classifications were weighted (see Table 4) for statistical purposes.

TABLE 4

NUMERICAL WEIGHTINGS ASSIGNED TO THE ABILITY CLASSIFICATIONS

Ability Classification	Weighting
A Beginner (Have not done any previous sewing)	1
Inexperienced (Have sewed but need help in making a garment)	2
Experienced (Have sewed several garments and need little help with new ones)	3
Very Experienced (Have sewed several types of garments in various fabrics, including synthetics. Need some help)	4
A Professional (Have sewed all types of garments for myself and other people. Rarely need help.)	5

When the number of dresses students had made was correlated with their grade on the dress project, a correlation coefficient of +.40 resulted. The coefficient of correlation between the students' classification of their ability and their final course grade was +.44. Both correlation coefficients were too low to place any significant degree of confidence in the effect of experience and of judgment of one's own ability on course grades.

Since the experience questionnaire was not developed as an instrument for predictive purposes, the results should

not be interpreted as such. To judge from comments the researcher received from instructors who used the experience questionnaire in gaining insight into their students' backgrounds, the questionnaire seemed helpful.

Several respondents stated that they had no sewing experience, while one student estimated that she had made 210 garments. The average number of garments made by students who placed themselves in the various ability classifications showed a considerable range (see Table 5). The extremely wide range of number of times students had had the opportunity for clothing construction experience provides some indication of the extent of the heterogeneity within the sample.

TABLE 5

PERCENTAGE OF STUDENTS PLACING THEMSELVES IN EACH ABILITY CLASSIFICATION AND THE AVERAGE NUMBER OF GARMENTS MADE BY STUDENTS IN EACH CATEGORY

Ability Classification	Percentage	Average Number of Garments
A Beginner	11.0	01.*
Inexperienced	34.1	12.
Experienced	35.4	45.
Very Experienced	12.2	97.
A Professional	7.3	66.

*Those students who indicated they had made garments placed themselves in the "A Beginner" category because they had had no clothing construction instruction.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The major problem in this study was the development of two equivalent forms (Form A and Form B) of an objective type pretest for the assessment of student ability to understand and apply the principles of clothing construction. Another problem was the development of an experience questionnaire to provide instructors with information concerning past clothing construction experience of students and student opinion of their own clothing construction ability at the time of enrollment in Principles of Clothing Construction (TCRA 152) at Michigan State University.

The study was supported by the fact that very few pretests have been developed to test the understanding and application of specific principles of clothing construction. In addition, Michigan State University did not have a pretest in clothing construction, therefore, the need for such an evaluation instrument seemed to exist.

A panel of judges from Michigan State University validated the instructional content of the course by means of a check list showing the content areas and the competencies being measured. The researcher received assistance from

one test construction expert and one clothing construction expert in the development of the instruments.

Twenty-four freshmen home economics students at Western Michigan University who had not previously taken a college clothing construction course responded to the pilot test. Due to the small sample, only coefficients of reliability and correlation and item difficulty indices were determined. The coefficient of reliability was .58 for Form A and .55 for Form B. The coefficient of correlation between Forms A and B was +.52. Items with difficulty indices of less than 30 per cent or more than 70 per cent were revised or rewritten before they were included in the pretest.

The same statistical formulas were applied to the pilot test and the pretest. The coefficients of reliability were determined by the Analysis of Variance method, while the coefficients of correlation were determined by the Pearson Product-Moment formula. The item difficulty indices were determined by computing the percentage of students who passed each item. The difference between the proportion of students scoring in the upper 27 per cent and the proportion scoring in the lower 27 per cent of the pretest group constituted the item discrimination indices.

The pretest and experience questionnaire were administered to 82 enrollees in Principles of Clothing Construction (TCRA 152) at Michigan State University Spring Term, 1962. Coefficients of reliability of .734 and .732 were obtained

for Form A and Form B, respectively. The understanding sections of the two forms showed a coefficient of correlation of +.53 while the application sections of the two tests showed a correlation coefficient of +.70 A correlation coefficient of +.72 was obtained for the total scores on the two test forms. This indicated a high total correlation with marked relationship between the tests.

The criterion for validation of the pretest was the final grade in TCRA 152. Coefficients for the entire Form A and entire Form B were +.55 and +.45, respectively. The coefficient for the Form A understanding items was +.51; for the Form B understanding items, it was +.39. The application items showed validity coefficients of +.52 for Form A and +.50 for Form B when they were correlated with the criterion.

Validation of the correct answer key was determined by a panel of five judges who were TCRA 152 instructors. A 50 per cent agreement was necessary for validation of an answer.

Tabulations of the experience questionnaire indicated that some students had no experience prior to TCRA 152 while one student indicated she had made approximately 210 garments. The coefficient of correlation between the student classification of clothing construction ability and final course grade was +.44. The correlation coefficient between the number of dresses made and the grade received on the dress project for the course was +.40. Neither of these figures was considered significant.

Conclusions

The following conclusions were drawn on the basis of an analysis of the data in this study:

1. Since no questions concerning procedure arose during the administration of the pretest or the experience questionnaire, the directions were assumed to be adequate and clear.
2. Because all students had completed the test in less than the allotted time, the 50 minute limitation was judged to be sufficient. In light of the findings, the test could have been lengthened for more efficient use of the time period or the time period could have been reduced.
3. Test items might have had higher and more desirable discrimination indices had the pilot study included a larger sample on which to base test revisions.
4. Higher discrimination indices might have appeared if more time had been allowed between the pilot study and the pretest for examination and revision of the test items by the test and clothing construction experts and the researcher.
5. From inquiries and comments of the respondents after they had completed the pretest, the pretest seemed to give the students a preview of the course. The pretest seemed to help students to become aware of new material and to promote a desire to learn more about certain areas of clothing construction.

6. Pretest Form A and Form B were reliable and valid to the extent of material usefulness.
7. Relatively little correlation between student opinions of their clothing construction ability and final course grades might indicate that students cannot accurately judge their capabilities.
8. The quantity of a particular type of garment previously made by a student does not necessarily indicate her level of ability, as judged by her instructor, on a similar garment made as a class project

Recommendations

In consideration of the steps which have already been taken in constructing a pretest for Principles of Clothing Construction (TCRA 152) at Michigan State University and of the findings of this study, the following recommendations are submitted:

1. Further studies should be conducted to improve the two evaluation instruments. Elimination of duplicate and non-discriminating items and replacement with new items is essential.
2. The test validity might be studied in detail by a breakdown of the criterion into defined application, understanding, and skill sections. This would provide each section of the pretest forms with a more equivalent criterion than was used in this study.

3. The time limitation of the two pretest forms should be studied and reapportioned according to the length of the test. Experimentation with shorter time limits would serve to determine the actual relationship of time limits to the reliability and validity of the tests.
4. Because the present answer sheets are time consuming to score, they might be replaced by IBM scoring sheets. Change in scoring method would become feasible only after the need for item analysis data no longer exists.
5. Further studies should be conducted to determine the effectiveness of the evaluation instruments as criteria for sectioning students into classes representing different homogeneous levels of ability.
6. Experimentation might be done to determine the effectiveness of the pretest as a criterion for allowing exceptional students to bypass Principles of Clothing Construction (TCRA 152).
7. Since skills enters into the performance and final grade of students, an evaluation device measuring skill seems necessary.

APPENDICES

APPENDIX A

A CHECK LIST TO DETERMINE IF THE INSTRUCTIONAL CONTENT OF TCRA 152 INVOLVES AN UNDERSTANDING OF AND/OR AN APPLICATION OF PRINCIPLES OF CLOTHING CONSTRUCTION

PURPOSE: To obtain the opinion of staff in textiles and clothing concerning course content taught in the beginning clothing construction course which involves understanding of principles, application of principles, or both understanding and application of principles of clothing construction.
To obtain a basis for relating understanding and/or application of the principles of clothing construction to course content and test items.

DATE: _____

DIRECTIONS: Course content topics in TCRA 152 are listed below. Please read carefully and delete any of the topics which you feel are not appropriate, and add any topics which you feel have been omitted. Next, go back and place a check in the left column if you feel the topic requires the understanding of a principle. Place a check in the right column if you feel the topic requires the application of a principle. If you feel the topic requires the understanding and the application of a principle, place a check in both columns. When you have completed the check list, please return it to the graduate box in the Textiles and Clothing office.

Course Content of TCRA 152	Understanding of a Principle	Application of a Principle
1. Principles of Clothing Construction		
2. Technical Knowledge of Equipment		
3. Sewing Machine Operation		
A. Control of the machine		
B. Threading the machine		
C. Testing tension		
D. Testing correct stitch length		
E. Securing thread ends		
4. Pattern Selection		
A. Types		
B. Taking individual measurments		

Course Content of TCRA 152	Understanding of the Principle	Application of a Principle
5. Paper Pattern Fitting A. Preparation of the pattern B. Techniques C. Judging fit of pattern a. Basic structural lines D. Preparation of pattern for alteration 6. Pattern Alteration B. Techniques B. General guides in alteration 7. Fabric Terms 8. Layout, Cutting, and Marking A. Preparation of fabric B. Planning the layout C. Cutting D. Marking 9. Assembling a Fitting Garment A. Staystitching B. Transferred markings as construction guides C. Analyzing fit of garment 10. Fabric Selection A. Type related to style of garment B. Suitability of type to individual's construction skill 11. Steps in Garment Construction A. Sequence B. Unit method 12. Lining, Underlining, and Interfacing A. Purpose B. Techniques C. Determining type to be used D. Cutting 13. Handling Curves and Gussets A. Stitching concave and convex curves a. Clipping and trimming B. Stitching and finishing corners C. Reinforcing gusset points D. Standards for a well-finished gusset		

Course Content of TCRA 152	Understanding of a Principle	Application of a Principle
14. Temporary Construction-Basting A. Types B. Uses C. Techniques 15. Seams A. Types B. Uses C. Techniques 16. Seam Finishes A. Types B. Uses C. Techniques 17. Pressing A. Purpose B. Techniques 18. Buttonholes A. Types B. Placement C. Techniques D. Finishing 19. Facings A. Types of fabrics used B. Purpose C. Placement D. Techniques E. Standards for a finished facing 20. Zippers A. Types B. Locations C. Techniques 21. Waistline Treatment A. Construction processes which must precede B. Techniques C. Ease D. Reinforcement E. Waistbands 22. Hems A. Types B. Techniques a. Grading C. Stitches 23. Belts A. Materials for stiffening B. Techniques C. Loops 24. Standards of Clothing Construction		

APPENDIX B

IDENTIFICATION OF THE PRINCIPLES AND TYPE OF MEASUREMENT INVOLVED IN ITEMS ON FORM A AND FORM B

Item Number			
Form A	Form B	Principle	Type of Measurement
1	21	I	Understanding
2	25	IV	Understanding
3	6	II	Application
4	43	I	Understanding
5	31	I	Understanding
6	4	IV	Application
7	24	IV	Understanding
8	9	IV	Understanding
9	35	III	Understanding
10	10	IV	Understanding
11	11	III	Application
12	32	III	Understanding
13	2	II	Understanding
14	37	I	Understanding
15	42	IV	Understanding
16	41	I	Understanding
17	38	I	Understanding
18	3	III	Application
19	39	I	Understanding
20	36	III	Application
21	13	III	Application
22	45	III	Understanding
23	16	III	Understanding
24	33	I	Understanding
25	44	I	Application
26	40	IV	Application
27	46	II	Understanding
28	48	IV	Application
29	7	II	Application
30	12	IV	Application
31	15	II	Application
32	22	IV	Understanding
33	19	III	Understanding
35	17	I	Application
36	23	III	Application
37	18	IV	Understanding
38	47	III	Understanding
39	8	III	Understanding

APPENDIX B--Continued

Item Number			
Form A	Form B	Principle	Type of Measurement
40	5	I	Application
41	26	IV	Application
42	27	IV	Application
43	28	IV	Application
44	29	IV	Application
45	30	IV	Application
46	34	III	Understanding
47	64	IV	Application
48	65	IV	Application
49	66	IV	Application
50	67	IV	Application
51	68	IV	Application
52	54	IV	Application
53	55	IV	Application
54	56	IV	Application
55	57	IV	Application
56	58	IV	Application
57		II	Understanding
58		II	Understanding
59	1	II	Understanding
60		II	Understanding
61		IV	Application
62		IV	Application
63	20	IV	Application
64		IV	Application
65		IV	Application
66	69	IV	Application
67	71	IV	Application
68	73	IV	Application
69	72	IV	Application
70	70	IV	Application
71	74	IV	Application
72	75	IV	Application
73	76	IV	Application
74	77	IV	Application
75	78	IV	Application
76	79	IV	Application
77	49	IV	Application
78	50	IV	Application
79	51	IV	Application
80	52	IV	Application
81	53	IV	Application
82	59	IV	Application
83	60	IV	Application
84	61	IV	Application
85	62	IV	Application
86	63	IV	Application
34		III	Understanding
	14	II	Application

APPENDIX C

MICHIGAN STATE UNIVERSITY East Lansing
College of Home Economics • Department of Textiles •
Clothing • and Related Arts

February 23, 1962

Dr. Mary Smith, Head
Home Economics Department
Lansing University
Lansing, Michigan

Dear Dr. Smith:

As a part of my master's thesis I am formulating an instrument to test clothing construction ability prior to instruction in a college clothing construction class. This will be a paper-and-pencil test requiring one hour and fifty minutes. Dr. Beatrice O'Donnell and Dr. Mary Gephart at Michigan State University are directing this study. We are hoping you will be interested in participating in this test.

Students in our beginning course in clothing construction come to us with very different backgrounds. It is expected that a test, such as the one I am pretesting, will be of help in sectioning or determining levels of ability and understanding among students.

I would like to ask your cooperation in allowing me to administer this test to your freshmen who are enrolled in home economics but who have not yet taken a college clothing construction course. Any information obtained about your students or concerning the test would be available for your use. Would March 6 through 9 or March 12 satisfactorily suit your academic schedule?

Please let me know your decision, possible days and hours which would be most convenient for you, and the number of students who would be available for testing.

Yours truly,

Mildred Rothgarn/s/

Mildred Rothgarn
Graduate Student in Textiles and Clothing
Michigan State University

Mary Gephart/s/
Mary Gephart, Chairman
Textiles, Clothing and Related Arts Department
Michigan State University

APPENDIX D

FORM A AND FORM B

APPENDIX D

PRETEST IN
PRINCIPLES OF CLOTHING CONSTRUCTION

TEXTILES, CLOTHING AND RELATED ARTS DEPARTMENT

MICHIGAN STATE UNIVERSITY

FORM A

Do not open the test booklet until you are told to begin. Although this test will not affect in any way your grade in a clothing construction course, carefully read and answer each question as best you can. Write the letter which indicates your choice of the correct answer in the blank at the right of the question number on the answer sheet. Do not write on the test booklet. Write legibly and use capital letters. If you complete the test early, go back and check your answers to be sure they are correct. When time is called, close the test booklet and turn it in with your answer sheet.

MULTIPLE-CHOICE

Place at the right of each number on the answer sheet the letter of the word or phrase which best completes a statement or best answers a question.

1. The distance around a garment piece is its:

   A. cut edge.
   B. perimeter.
   C. seamline.
   D. secant.

2. Lining is placed in a wool skirt to:

   A. lessen the sagging of the garment fabric.
   B. lessen the strain on the garment fabric.
   C. shape the wool skirt to the waist and hip curves.
   D. support the hem.

3. At a dress paper pattern fitting a bulge appeared at the armscye of a bodice front. In order to produce a properly fit garment alteration must be done on the:

   A. bodice front.
   B. bodice front and facing.
   C. bodice front and sleeve.
   D. bodice front, facing, and sleeve.

4. Which of the following does not radiate from a prominent body curve?

   A. Curved hem.
   B. Gathers
   C. Released fullness.
   D. Tucks.

5. "Ease" is a term used to refer to:

   A. the lack of difficulty in fitting two seamlines together.
   B. the method of attaching a longer seamline to a shorter seamline without apparent fullness.
   C. the skill and smoothness with which you can sew two seamlines together.
   D. none of these.

6. When constructing a worsted jacket the neckline darts should be pressed on a:

   A. regular ironing board.
   B. needleboard.
   C. sleeve board.
   D. tailor's ham.

7. Bound or corded buttonholes are easiest to make on firmly woven:

   A. cotton.
   B. nylon.
   C. silk.
   D. wool.

8. To insure a perfect stitch and good tension, test the fabric by stitching a short distance on:

   A. a double thickness of fabric on crosswise grain.
   B. a double thickness of fabric on lengthwise grain.
   C. a double thickness of fabric on the bias.
   D. a single thickness of fabric on the lengthwise grain.

9. Usually garment pieces are cut so the center front and center back are parallel to the lengthwise grain of the fabric because:

   A. the garment pieces are easier to match than if they were cut another way.
   B. the garment pieces drape better than if they were cut another way.
   C. the garment pieces stretch less than if they were cut another way.
   D. none of these.

10. When you select a pattern for a wool plaid jumper, which of the following is of most importance?

   A. Ease of care.
   B. Ease of alteration.
   C. Suitability to the fabric.
   D. Suitability to other items in your wardrobe.

11. Which of the following fabrics has an "up and down" to it?

   A. Moire taffeta.
   B. Percale print.
   C. Rayon gabardine.
   D. Cotton velveteen.

12. Most rough fabrics will:

   A. not stretch.
   B. stretch a great amount.
   C. stretch only on the warp.
   D. stretch only slightly.

13. When two circles are concentric:

A. one is twice as large as the other.
B. they are tangent to each other.
C. they have identical arcs.
D. they have different radii.

14. The neckline seam allowance of this facing pattern is indicated by the dotted line. What is the name of the curve at the neckline?

A. Concave.
B. Convex.
C. Radial.
D. Rounded.

15. Wool is shaped most satisfactorily by:

A. ironing it against the grainline.
B. dampening it slightly and smoothing it over the edge of an ironing board.
C. soaking it in water, shaping it by hand, and allowing it to dry in the desired position.
D. steaming it over a curved wool-covered surface.

16. Adding or removing width and length in any part of a pattern requires careful examination of the:

A. direction sheet which came with the pattern,
B. markings on the pattern so alterations are done onlywhere the pattern indicates they should be done.
C. pattern pieces pinned together and tried on the figure.
D. width of all the seam allowances.

17. A seam must be pressed flat before further construction is done because:

A. the perimeter of the garment piece is reduced when the seam allowance remains unpressed.
B. the notches are easier to match because they are pressed when the seam is pressed.
C. the garment will not retain its shape when it is worn.
D. it will be easier to see the amount of seam allowance which must be removed to eliminate excess bulk.

18. Which of the following fabrics has greatest extensibility?

A. Gingham.
B. Nylon knit.
C. Worsted suiting.
D. Silk shantung.

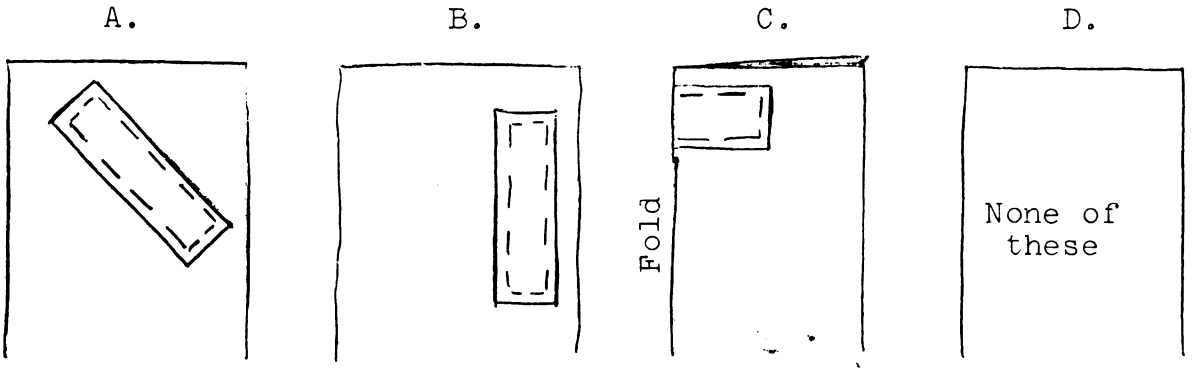
19. Gussets are used in a garment to:

A. smooth out a seamline.
B. provide decoration on the garment.
C. reinforce a seamline.
D. lengthen a seamline.

20. In most cases the best results are obtained if interfacing is cut on the:

A. bias.
B. crosswise grain.
C. lengthwise grain.
D. same grain as the area to be interfaced.

21. Which waistband pattern is placed properly on this plain black skirt fabric?



22. Staystitching is done to prevent:

A. stretching while making the garment.
B. raveling while making the garment.
C. facings from popping out after the garment is constructed.
D. a slightly full seamline from being gathered while it is being stitched.

23. Preshrinking cotton fabric means:

A. pressing fabric with a steam iron.
B. rolling fabric in a damp sheet.
C. soaking fabric in lukewarm water and rolling it in a towel to dry.
D. washing new fabric in a washing machine and hanging it up to dry.

24. Darts are stitched in a garment:

A. in areas where there is little strain.

B. on the grainline so the garment pieces will not be distorted.
C. parallel and perpendicular to the floor.
D. so they release fullness for prominent body curves.

25. If you are long-waisted, your bodice pattern pieces must be lengthened by slashing and spreading:

A. across the length of the pattern piece.
B. across the length of the pattern piece below the armscye and at the waistline dart.
C. across the width of the pattern piece.
D. the waistline dart.

26. For the neckline finish of a silk shantung dress the raw edge of a self-fabric facing should be finished by:

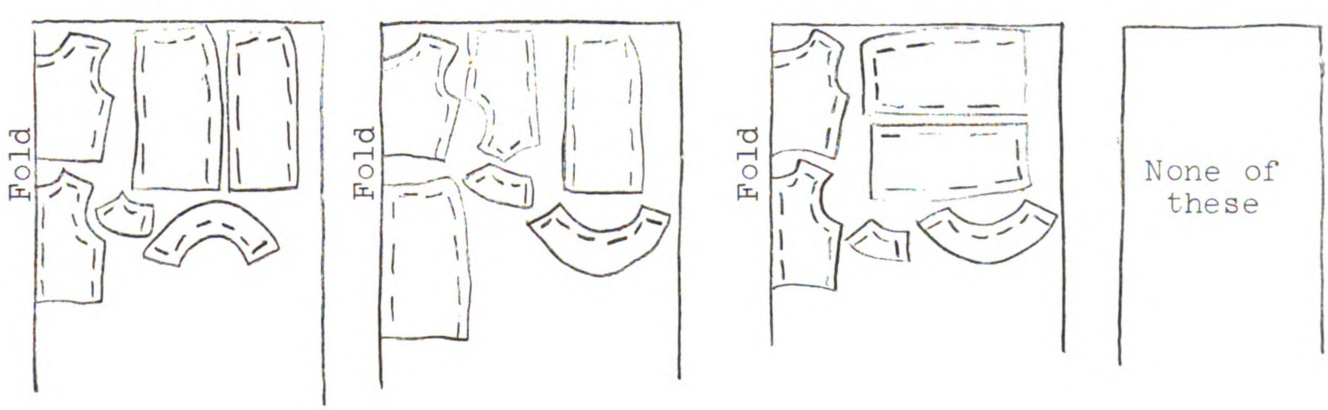
A. binding.
B. catch-stitching it to the garment.
C. top-stitching rayon seam tape to the raw edge.
D. turning under the raw edge 1/8 inch and pressing it to a very sharp crease.

27. The radius of a circle is:

A. the distance across the circle through its center point.
B. the distance around the circle.
C. one-half the diameter of the circle.
D. one-half the secant of the circle.

28. Which of the following pattern layouts is correct for a velveteen dress?

A. B. C. D.



29. What should be done to flatten the seam allowances of the neckline seam of a cotton dress?

A. Clip.
B. Notch.
C. Stitch 1/8 inch from the raw edge.
D. Steam and stretch.

30. Grading must be done on the seams of:

A. gingham.
B. nylon knit.
C. silk shantung.
D. wool coating.

31. The hem of a flared skirt made of loosely-woven wool fabric should be:

A. cut off and faced with narrow twill tape.
B. cut off, shrunk, and edge-stitched.
C. gathered, turned up, and edge-stitched.
D. gathered, turned up, and shrunk.

32. Not all methods of transferring pattern markings are suitable for cotton organdy because:

A. it has a great amount of finish on it which will absorb certain transfer markings.
B. it has a rough surface and the markings will not show on the fabric.
C. it is washable and the markings will wash out of the fabric.
D. none of these.

33. The purpose of interfacing fabrics is:

A. to dry quickly in laundering.
B. to give support to the garment piece.
C. to give weight to the garment piece.
D. none of these.

34. Uneven ends of fabric are cut along one continuous thread to determine:

A. crosswise grain of the fabric.
B. lengthwise grain of the fabric.
C. the fold of the fabric.
D. true bias of the fabric.

35. When you machine stitch two unequal seamline lengths together:

A. a lapped seam is necessary.
B. either piece of fabric may be on top.
C. the shorter piece of fabric may be on top.
D. the longer piece of fabric may be on top.

36. Bias strips of fabric should be stitched together:

A. alternately on the lengthwise yarns and on the bias.
B. on the bias.
C. on crosswise yarns.
D. on lengthwise yarns.

37. When constructing a dress, pressing should be done:

A. before a seam or dart is to be crossed by another line of stitching.
B. before the waistline seam is stitched.
C. after a seam or dart is made.
D. after the garment is completed.

38. Fabric stretches most on the:

A. crosswise grain because these threads are weaker than the lengthwise threads.
B. lengthwise threads because these threads hang perpendicular to the floor so they stretch.
C. selvage because these yarns intersect at an angle.
D. bias because these yarns slip past one another with the pull of an angle.

39. The term "up and down" of the fabric means that:

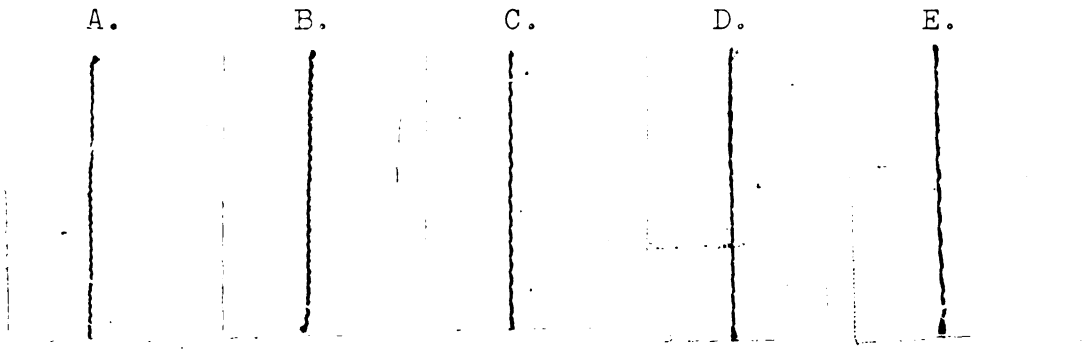
A. there is a design on the fabric which gives it a right and a wrong side.
B. the design of the fabric goes in one direction.
C. the fabric must be hung to dry so the warp is perpendicular to the floor.
D. the warp threads of the fabric differ from the filling threads.

40. In order to change the location of a seamline but not alter the size of the garment:

A. remove basting and mark the new seamline with a row of pins.
B. remove the basting and place the correction line parallel to the seamline.
C. leave the basting in the garment and place pins to mark the new correction line.
D. pin the folded edges to the outside and place the correction line parallel to it.

41.-45. Attached below are five samples of machine stitching. Place on the answer sheet the letter of the sample stitch which is best for each of the fabrics listed below:

41. Cotton print.
42. Wool coating.
43. Rayon or silk shantung.
44. Organdy.
45. Seersucker.



46. The grainline of fabric in a cut garment piece may be distorted by:

A. cutting all seam allowances one-half inch larger than the amount allowed on the pattern.
B. overhandling the fabric while the pattern markings are being transferred to the garment piece.
C. preshrinking of the fabric.
D. all of these.

MATCHING

47.-51. Listed below in Column A are statements pertaining to methods of transferring pattern markings to fabric. Listed in Column B are methods of marking. Indicate in the space following each number on the answer sheet the letter of the appropriate method described in each statement. (A method may be used more than once.)

A--Statements

47. A quick and satisfactory method of marking a medium weight fabric of plain color.
48. A quick and satisfactory method of marking very sheer fabrics.
49. A quick and satisfactory method of marking wool fabrics which will be constructed "at one sitting."

50. A method of marking which does not wash out of fabric very easily.
51. A method of marking which is durable for a very thick, fluffy wool fabric.

B--Methods

A. Dressmaker's carbon and tracing wheel.
B. Pins.
C. Tailor's chalk.
D. Tailor's tacks.
E. Thread.
F. Wax chalk.
G. None of these.

52.-56. Listed below in Column A are types of fabrics. Listed in Column B are iron temperatures. Indicate in the space following each number on the answer sheet the letter of the temperature which is best suited to each fabric. (A temperature may be used more than once.)

A--Fabrics	B--Temperatures
52. Cotton print.	A. Low (225 - 275° F.)
53. Silk shantung.	
54. Wool flannel.	B. Medium (325 - 375° F.)
55. Acetate taffeta.	
56. Nylon net.	C. High (425 - 475° F.)

57.-60. Listed below in Column A are terms associated with circles. Listed in Column B are descriptions pertaining to circles. In the space following each number on the answer sheet write the letter of the appropriate description. (A description may be used more than once.)

A--Terms	B--Descriptions
57. Arc	A. Circles which are identical.
58. Circumference	B. The curved enclosing section of the circle.
59. Concentric	C. One-half the circle's diameter.
60. Congruent	D. Any straight segment of a circle.
	E. None of these.

61.-65. Listed below in Column A are types of fabrics. Listed in Column B are methods of finishing seams. Indicate in the space following each number on the answer sheet the letter of the most time-saving, yet appropriate, method. (A method may be used more than once.)

A--Fabrics	B--Seam Finishes
61. Cotton sateen	A. Pinked
62. Wool flannel	B. Bound
63. Silk shantung	C. Catch-stitched to the garment
64. Acetate taffeta	D. Edge-stitched
65. Linen suiting	E. Edge turned under and stitched
	F. Overcast
	G. None of these

66.-70. Listed below in Column A are types of fabrics. Listed in Column B are methods of preshrinking fabrics. Indicate in the space following each number on the answer sheet the letter of the appropriate preshrinking method. (A method may be used more than once.)

A--Fabrics	B--Methods
66. Cotton print	A. Press with a pressing cloth.
67. Linen suiting	B. Roll in a damp sheet, leave for several hours, and press lightly.
68. Nylon knit	
69. Acetate taffeta	
70. Wool flannel	C. Soak in lukewarm water and roll in a sheet to remove excess moisture.
	D. None of these.

71.-76. Listed below in Column A are types of fabrics. Listed in Column B are effects produced by gathering various fabrics. In the space following each number on the answer sheet write the letter of the effect which will appear. (An effect may be used more than once.)

A--Fabrics	B--Effects
71. Gingham	A. Gathers stand out from the waist giving a bouffant appearance.
72. Faille	
73. Fine wool crepe	
74. Organdy	B. Gathers fall softly from waist to hip.
75. Sailcloth	
76. Silk shantung	C. Gathers fall in soft folds from waist to hem.
	D. Gathers look like thick bulky folds.
	E. None of these.

77.-81. Listed below in Column A are locations of seams. Listed in Column B are types of seams. Indicate in the space following each number on the answer sheet the letter of the appropriate type of seam. (A seam type may be used more than once.)

A--Locations	B--Seams
77. Waistline of cotton shirtwaist.	A. Plain
78. Side seam of a skirt of very sheer fabric.	B. French
79. Center back seam of a heavy wool jacket.	C. Flat felled
80. Bodice underarm seam of a washable cotton sports blouse.	D. Lapped
81. Center back of a rayon skirt lining.	E. None of these

82.-86. Listed below in Column A are types of garments. Listed in Column B are methods of making buttonholes. Indicate in the space following each number on the answer sheet the letter of the most appropriate method. (A method may be used more than once.)

A--Garments	B--Methods
82. Cotton print housedress.	A. Machine-worked.
83. Wool flannel suit jacket.	B. Bound or corded.
84. Linen coat.	C. Machine stitched twice around the edge of bottonhole slit.
85. Loosely-woven silk dress.	D. None of these.
86. Terry cloth bathrobe.	

ANSWER SHEET FOR PRETEST IN
PRINCIPLES OF CLOTHING CONSTRUCTION

FORM A

NAME _____ DATE _____

COLLEGE OR UNIVERSITY _____

1. _____	23. _____	45. _____	67. _____
2. _____	24. _____	46. _____	68. _____
3. _____	25. _____	47. _____	69. _____
4. _____	26. _____	48. _____	70. _____
5. _____	27. _____	49. _____	71. _____
6. _____	28. _____	50. _____	72. _____
7. _____	29. _____	51. _____	73. _____
8. _____	30. _____	52. _____	74. _____
9. _____	31. _____	53. _____	75. _____
10. _____	32. _____	54. _____	76. _____
11. _____	33. _____	55. _____	77. _____
12. _____	34. _____	56. _____	78. _____
13. _____	35. _____	57. _____	79. _____
14. _____	36. _____	58. _____	80. _____
15. _____	37. _____	59. _____	81. _____
16. _____	38. _____	60. _____	82. _____
17. _____	39. _____	61. _____	83. _____
18. _____	40. _____	62. _____	84. _____
19. _____	41. _____	63. _____	85. _____
20. _____	42. _____	64. _____	86. _____
21. _____	43. _____	65. _____	
22. _____	44. _____	66. _____	

PRETEST IN

PRINCIPLES OF CLOTHING CONSTRUCTION

TEXTILES, CLOTHING AND RELATED ARTS DEPARTMENT

MICHIGAN STATE UNIVERSITY

FORM B

Do not open the test booklet until you are told to begin. Although this test will not affect in any way your grade in a clothing construction course, carefully read and answer each question as best you can. Write the letter which indicates your choice of the correct answer in the blank at the right of the question number on the answer sheet. Do not write on the test booklet. Write legibly and use capital letters. If you complete the test early, go back and check your answers to be sure they are correct. When time is called, close the test booklet and turn it in with your answer sheet.

MULTIPLE-CHOICE

Place at the right of each number on the answer sheet the letter of the word or phrase which best completes the statement or best answers the question.

1. The curved part of a circle can be divided into sections called:

   A. arcs.
   B. elipses.
   C. structural lines.
   D. tangents.

2. Circles which have the same center but different radii are called:

   A. concentric.
   B. congruent.
   C. graduate.
   D. tangent.

3. Fabrics which are extensible:

   A. are durable so they will wear well.
   B. can be used for more than one type of garment.
   C. can be washed.
   D. will stretch.

4. When constructing a wool dress, pressing of bust darts should be done on a:

   A. needleboard.
   B. regular ironing board.
   C. sleeve board.
   D. tailor's ham.

5. In order to alter the size of a garment and change the location of the seamline:

   A. remove basting and readjust the line by pinning.
   B. leave the basting in and place pins to mark the new correction line.
   C. pin the folded edges to the outside and place the correction line parallel to it.
   D. remove the basting and place the correction line parallel to the seamline.

6. You are fitting a pattern for a dress for your sister. You find that extra length is needed in the upper back area and extra width is needed in the shoulder area of the bodice pattern. Which pattern pieces must be altered?

A. Bodice back, sleeve, and bodice front.
B. Bodice back, sleeve, and skirt back.
C. Bodice back, skirt back, and bodice front.
D. Bodice back, bodice front.

7. What should be done to flatten the seam allowance of the center back seam of a straight cotton skirt?

A. Clip.
B. Notch.
C. Steam and stretch.
D. None of these.

8. The term "up and down" of fabric means that:

A. the design of the fabric runs either up or down.
B. it must be ironed or pressed up and down on the lengthwise threads.
C. the pattern of the fabric is directional.
D. it must be hung to dry so the selvage is perpendicular to the floor to prevent stretching.

9. To insure a perfect stitch and good tension, test the fabric by stitching a short distance on:

A. a single thickness of fabric on the bias.
B. a double thickness of fabric on crosswise yarns.
C. a double thickness of fabric on lengthwise yarns.
D. None of these.

10. When you select a pattern for a ruffled cotton dress, you must consider its suitability to the fabric and:

A. ease in laundering.
B. placement of the ruffles so they will not interfere with alterations which may need to be made.
C. your measurements.
D. your figure type.

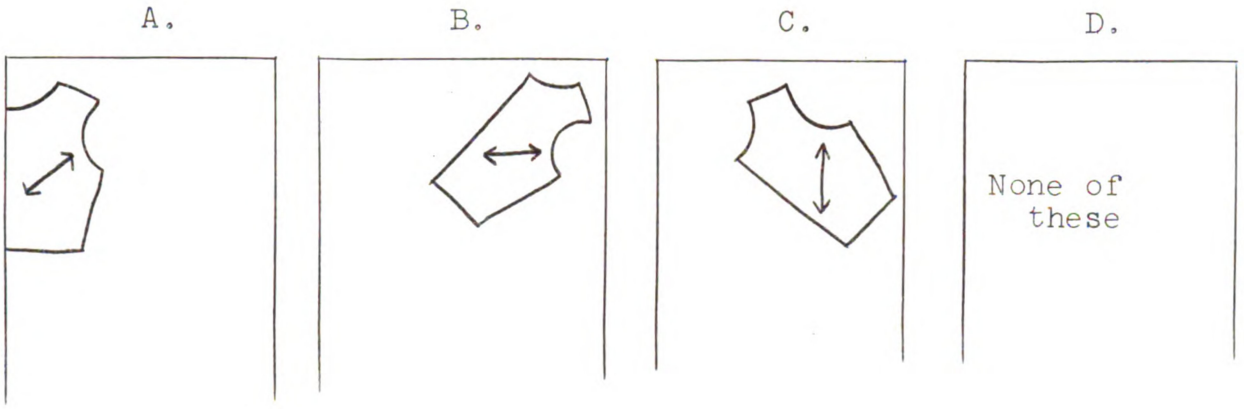
11. Which of the following fabrics requires that all of the pattern pieces be laid in the same direction?

A. Satin.
B. Napped.
C. Stripe.
D. Twill.

12. Which of the seams in a wool suit should be graded?

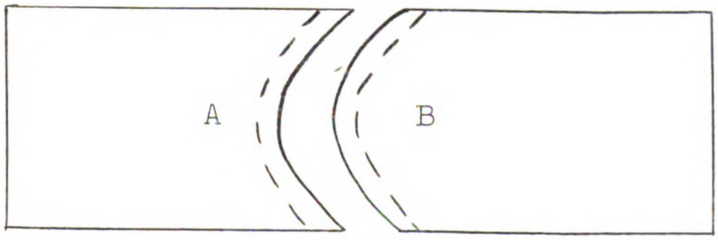
A. Center back seam of the jacket.
B. Dart of the jacket.
C. Side seam of the skirt.
D. Waistline seam of the skirt.

13. Which back bodice pattern is placed properly on this knit fabric?



14. Assume that these two pieces of fabric are stitched together on the dotted lines and that the seam allowances are pressed open. What should be done to the seam allowance of pattern A?

A. Clip.
B. Grade.
C. Notch.
D. Shrink.
E. Stretch.
F. Trim.
G. None of these.



15. Refer to the above question and indicate what should be done to the seam allowance of pattern B.

16. Preshrinking wool flannel means:

A. rolling fabric in a damp sheet.
B. pressing fabric with a steam iron and stretching the selvage into shape.
C. soaking the fabric in lukewarm water and rolling it in a towel to dry.
D. washing new fabric in a washing machine and hanging it up to dry.

17. When you stitch two unequal lengths of seams together by hand:

A. either piece of fabric may be on top depending on the placement of the seam.
B. the shorter piece of fabric should be on top.
C. the longer piece of fabric should be on top.
D. each seamline should be machine stitched first before they are stitched together.

18. When constructing a dress, pressing should be done:

A. after a seam or dart is made.
B. after the garment is completed.
C. before a seam or dart is to be crossed by another line of stitching.
D. before the waistline seam is stitched.

19. Interfacing fabrics differ from garment fabrics in order for them:

A. to give support to the garment fabric.
B. to give weight to the garment fabric.
C. to dry quickly in laundering or dry cleaning.
D. not to show under the garment fabric.

20. A satisfactory and quick method of finishing the seams of cotton fabric is to:

A. leave them unfinished because cotton fabrics ravel very little.
B. edge-stitch 1/8 inch from the raw edge.
C. turn under 1/8 inch and stitch close to the fold.
D. pink.

21. The perimeter of a garment piece is its:

A. cut edge.
B. circumference.
C. length.
D. width.

22. Not all methods of transferring pattern markings are suitable for velvet because:

A. it is washable and the markings will wash out of the fabric.
B. it has a rough surface and the markings will not show on the fabric.
C. it is made of a synthetic fiber which absorbs certain markings.
D. none of these.

23. Bias strips of fabric should be stitched together:

A. on crosswise threads or yarns.
B. on lengthwise threads or yarns.
C. on the bias.
D. alternately on the lengthwise threads or yarns and on the bias.

24. Bound buttonholes are most difficult to make on loosely-woven:

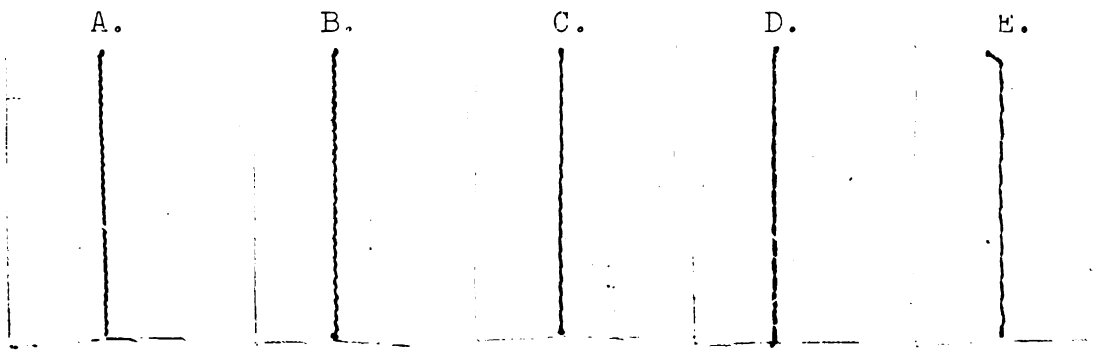
A. cotton.
B. linen.
C. nylon.
D. wool.

25. Underlining is placed in a wool skirt to:

A. lessen the strain on the garment fabric.
B. prevent the hemline from sagging.
C. shape the wool skirt fabric to the body curves.
D. support a curved hem.

26.-30. Attached below are five samples of machine stitching. Place on the answer sheet the letter of the sample stitch which is best for each of the fabrics listed below.

26. Cotton print.
27. Wool coating.
28. Rayon or silk shantung.
29. Organdy.
30. Linen suiting.



31. The method of fitting a longer seamline to a shorter seamline to obtain a smooth hand-sewn seam is called:

A. blocking.
B. easing.
C. fitting.
D. gathering.

32. Usually smooth-textured fabrics will:

A. stretch only on the filling threads.
B. stretch only on the warp.
C. stretch only slightly.
D. not stretch.

33. The major function of a dart is to:

A. fit the garment pieces to the midriff of the body.
B. provide ease.
C. prevent garment pieces from stretching in areas where there is strain on the fabric.
D. shape the garment pieces.

34. The grainline of fabric in a cut garment piece may be distorted by:

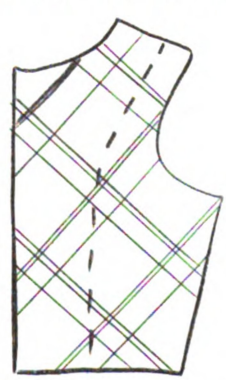
A. cutting all seam allowance one-half inch larger than the amount allowed on the pattern.
B. preshrinking the fabric.
C. overhandling the fabric while the pattern pieces are being marked.
D. all of these.

35. A pattern may be laid out differently from the layout on the instruction sheet if:

A. fabric can be saved by turning the pattern pieces in different directions on the fabric.
B. the fabric can be refolded so that all fold lines on the pattern are placed on the fold of the fabric.
C. lengthwise grain, crosswise grain, and the bias of the fabric are not changed.
D. each pattern piece is pinned to the fabric and measured carefully after it has been pinned.

36. The interfacing along the center front of this wool woven-plaid bodice (indicated by the dotted line) should be cut on:

A. the same grain as the area to be interfaced.
B. crosswise grain.
C. lengthwise grain.
D. the bias.



37. The neckline curve is most appropriately called a:

A. concave curve.
B. convex curve.
C. radial curve.
D. rounded curve.

38. A seam must be pressed flat:

A. before another seam is stitched over it.
B. after it is stitched so it won't be overlooked.
C. after the darts are pressed.
D. after the garment is completed.

39. A gusset is added to a garment to:

A. provide decoration on the garment.
B. reinforce a seamline.
C. increase the perimeter of a garment piece.
D. shape the garment to the body curves.

40. The raw edge of the center back seam allowance of a heavy wool jacket should be finished by:

A. binding.
B. catch-stitching it to the garment.
C. turning under the raw edge 1/8 inch and stitching close to the fold.
D. none of these.

41. The best fit from a paper pattern will be obtained if the:

A. hip measurements of the body and the pattern compare.
B. pattern is measured before the garment is cut.
C. pattern pieces are pinned together and tried on the figure.
D. pattern size is the same as the size that fits you best in ready-made garments.

42. Taffeta may be best shaped by:

A. pulling it over the edge of an ironing board.
B. soaking it in water.
C. steaming it.
D. none of these.

43. Which of the following must radiate from prominent body curves?

A. Darts.
B. Tucks.
C. Gathers.
D. All of these.

44. Your pattern has two darts which fall from the back neckline downward parallel to the center back. Which alteration should be made if you have slightly prominent shoulder blades?

A. Move the dart to the shoulder seam.
B. Move the dart to the armscye.
C. Move the dart to the waistline.
D. Eliminate the dart and slash and spread the pattern lengthwise to add fullness from the shoulder to the waist of the pattern piece.

45. What should be done to the curved areas of each garment section to prevent them from stretching while the garment is being constructed?

A. Apply tape to the areas which will stretch.
B. Interface with a firm but sheer fabric.
C. Staystitch by machine.
D. Machine stitch the areas which will be handled most.

46. The distance from the center of a circle to the outside edge of a circle is called the:

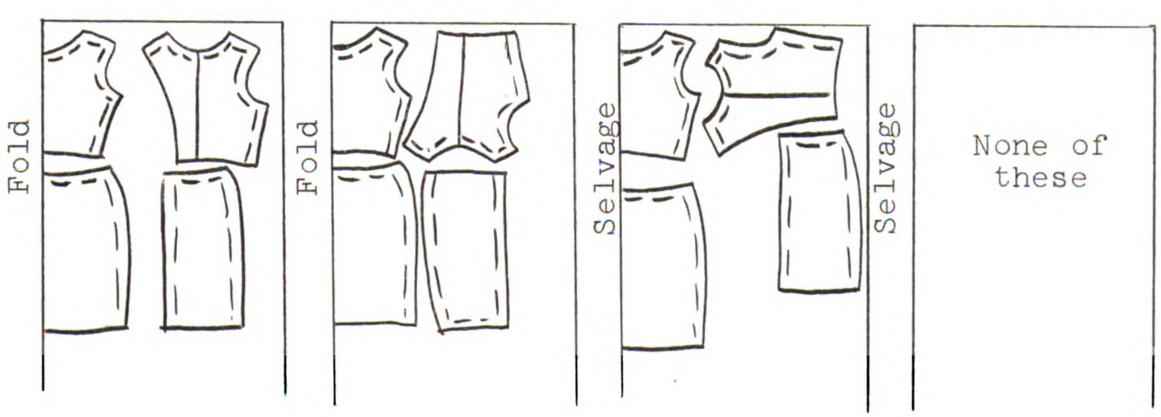
A. arc.
B. diameter.
C. radius.
D. tangent.

47. Fabric stretches most on the:

A. lengthwise grain because these threads hang perpendicular to the floor so they stretch.
B. crosswise grain because these threads are weaker than the lengthwise threads.
C. bias because the threads slip past one another with the pull of an angle.
D. raw edge because the threads are meshed together more loosely than they are in the middle of a piece of fabric.

48. Which of the following pattern layouts is most economical for a white broadcloth dress?

A. B. C. D.



MATCHING

49.-53. Listed below in Column A are locations of seams. Listed in Column B are types of seams. Indicate in the space following each number on the answer sheet the letter of the appropriate type of seam. (A type of seam may be used more than once.)

A--Locations	B--Seams
49. Waistline seam of a muslin trial dress.	A. Plain
50. Side seam of a percale skirt.	B. French
51. Underarm seam of a roll-up sleeve.	C. Flat felled
52. Side seam of a crepe lining.	D. None of these
53. Center back seam of a heavy wool coat.	

54.-58. Listed below in Column A are types of fabrics. Listed in Column B are iron temperatures. Indicate in the space following each number on the answer sheet the letter of the temperature which is best suited to each fabric. (A temperature may be used more than once.)

A--Fabrics	B--Temperatures
54. Light weight linen dress fabric.	A. High (425 - 475° F.)
55. Heavy weight denim.	B. Medium (325-375° F.)
56. Medium weight gingham.	
57. Medium weight acetate taffeta.	C. Low (225 - 275° F.)
58. 85% wool--15% nylon flannel.	

59.-63. Listed below in Column A are types of garments. Listed in Column B are methods of making buttonholes. Indicate in the space following each number on the answer sheet the letter of the most appropriate buttonhole method. (A method may be used more than once.)

A--Garments	B--Methods
59. Cotton print housedress.	A. Machine-worked
60. Wool flannel blazer.	B. Bound or corded
61. Light weight linen dress.	C. Machine stitched around the edge of the slit and overcast
62. Loosely-woven silk dress.	
63. Terry cloth bathrobe.	D. None of these

64.-68. Listed below in Column A are types of fabrics. Listed in Column B are methods of transferring pattern markings to fabric. Indicate in the space following each number on the answer sheet the letter of the appropriate method. (A method may be used more than once.)

A--Fabrics	B--Methods
64. Cotton print.	A. Chalk
65. Worsted suiting	B. Creasing
66. Silk shantung	C. Pencil
67. Terry cloth	D. Pins
68. Plain organdy	E. Tailor's tacks
	F. Dressmaker's carbon and tracing wheel
	G. None of these

69.-73. Listed below in Column A are types of fabrics. Listed in Column B are methods of preshrinking fabrics. Indicate in the space following each number on the answer sheet the letter of the appropriate method. (A method may be used more than once.)

A--Fabrics	B--Methods
69. Cotton print	A. Press with a pressing cloth.
70. Wool flannel	B. Soak in lukewarm water and iron dry.
71. Linen suiting	C. Soak in lukewarm water and roll in a sheet to remove excess moisture.
72. Acetate taffeta	D. Roll in a damp sheet, leave for several hours, and press lightly.
73. Nylon knit	E. None of these.

74-79. Listed below in Column A are types of fabrics. Listed in Column B are effects produced by pleating fabrics. Indicate in the space following the number on the answer sheet the letter of the effect which would be produced. (An effect may be used more than once.)

A--Fabrics	B--Effects
74. Gingham.	A. Pleats stand out from the waist producing a bouffant look.
75. Heavy wool crepe.	B. Pleats fall softly from the waist to the hip.
76. Cotton organdy.	C. Pleats fall in soft folds from the waist to the hem.
77. Faille.	D. Pleats are thick bulky folds.
78. Sailcloth.	E. None of these.
79. Nylon chiffon.	

ANSWER SHEET FOR PRETEST IN PRINCIPLES OF CLOTHING CONSTRUCTION

FORM B

NAME _____ DATE _____

COLLEGE OR UNIVERSITY _____

1._____	21._____	41._____	61._____
2._____	22._____	42._____	62._____
3._____	23._____	43._____	63._____
4._____	24._____	44._____	64._____
5._____	25._____	45._____	65._____
6._____	26._____	46._____	66._____
7._____	27._____	47._____	67._____
8._____	28._____	48._____	68._____
9._____	29._____	49._____	69._____
10._____	30._____	50._____	70._____
11._____	31._____	51._____	71._____
12._____	32._____	52._____	72._____
13._____	33._____	53._____	73._____
14._____	34._____	54._____	74._____
15._____	35._____	55._____	75._____
16._____	36._____	56._____	76._____
17._____	37._____	57._____	77._____
18._____	38._____	58._____	78._____
19._____	39._____	59._____	79._____
20._____	40._____	60._____	

APPENDIX E

EXPERIENCE QUESTIONNAIRE

NAME _____ DATE _____
COLLEGE OR UNIVERSITY _____ AGE _____
MAJOR _____ REQUIRED OR ELECTIVE _____
ADVISOR _____ GRADE POINT _____

Types of garments which you may have constructed are listed below. Indicate in the spaces the number of each type of garment you have constructed, placing the numbers in the respective columns. If you have constructed garments which are not listed, write the name of the garment in the blank spaces at the bottom of the chart and indicate in the proper space the number of garments you have made.

Types of Garments	Where Garments Were Constructed					Do Not Write In this Col.
	Senior High	Junior High	4-H Club	At Home (without help)	At Home (with help)	
Aprons						
Blouses and Shirts						
Coats						
Dresses						
Doll Clothes						
Pajamas						
Shorts and Slacks						
Skirts						
Slips						
Suits						

On the basis of your previous experience, how would you rate your ability to understand and apply knowledge previously gained to new clothing construction problems? (check one)

A beginner _____
(Have not done any previous sewing)

Inexperienced _____
(Have sewed but need help in making a garment)

Experienced _____
(Have sewed several garments and need little help with new ones)

Very experienced _____
(Have sewed several types of garments in various fabrics, including synthetics. Need some help)

A professional _____
(Have sewed all types of garments for myself and other people. Rarely need help)

APPENDIX F

JUDGES' AGREEMENT ON ANSWER KEY FOR FORM A

Item Number	Judges						Answer on Key	Percentage of Agreement
	I	II	III	IV	V	VI		
1	B	B	B	B	B	B	B	100.00
2	B	A	B	B	B	B	B	83.33
3	C	C	C	C	C	A	C	83.33
4	A	A	A	A	A	A	A	100.00
5	B	B	B	B	B	B	B	100.00
6	D	D	D	D	D	D	D	100.00
7	D	D	D	A	D	D	D	83.33
8	C	C	C	C	C	C	C	100.00
9	C	B	C	B	C	B	B C	50.00 50.00
10	C	C	C	D	C	C	C	83.00
11	D	D	D	D	D	D	D	100.00
12	B	B	B	B	B	B	B	100.00
13	D	D	D	D	D	D	D	100.00
14	A	A	A	A	A	A	A	100.00
15	D	D	D	D	D	D	D	100.00
16	C	C	C	C	C	C	C	100.00
17	A	A	A	D	A	No Response	A	80.00
18	B	B	B	B	B	B	B	100.00
19	D	D	D	D	D	D	D	100.00
20	C	D	D	D	D	D	D	83.33
21	B	B	D	D	B or D	B	B	57.14
22	A	A	A	A	A	A	A	100.00
23	C	C	C	A	C	A or C	C	71.42
24	D	D	D	D	D	D	D	100.00
25	C	A	C	C	C	C	C	83.33
26	C	C	C	C	C	C	C	100.00
27	C	C	C	C	C	A	C	83.33
28	D	D	D	D	A	D	D	83.33
29	A	A	A	C	A	A	A	83.33

APPENDIX F--Continued

Item Number	Judges						Answer on Key	Percentage of Agreement
	I	II	III	IV	V	VI		
30	D	D	D	D	D	D	D	100.00
31	D	D	D	D	D	D	D	100.00
32	D	D	D	D	D	C	D	83.33
33	B	B	B	B	B	B	B	100.00
34	A	A	A	A	A	A	A	100.00
35	C	C	C	D	C	D	C	66.66
36	D	D	D	D	D	D	D	100.00
37	A	A	A	A	A	A	A	100.00
38	D	D	D	D	D	D	D	100.00
39	B	B	B	B	B	B	B	100.00
40	C	C	C	C	C	C	C	100.00
41	C	C	B	B	C	C	C	66.66
42	C	E	C	E	C	C	C	66.66
43	B	B	B	B	B	B	B	100.00
44	A	C	A	C	A	B	A	50.00
45	C	C	B	E	C	C	C	66.66
46	B	B	B	B	B	B	B	100.00
47	A	A	A	A	A	A or C	A	85.71
48	G	G or B	G	G	No response	D	G	66.66
49	C	A	C	C	C	F or B	C	57.14
50	A	A	F	A or F	A	No response	A	66.66
51	D	D	D	G	No response	D or E	D	66.66
52	B	C	C	C	B	C	C	66.66
53	A	A	A	B	A	B	A	66.66
54	B	A	B	B	B	B	B	83.33
55	A	A	A or B	B	A	C	A	57.14
56	A	A	A	A	A	A	A	100.00
57	E	E	E	E	E	C	E	83.33
58	B	B	B	B	B	B	B	100.00
59	E	E	E	E	E	E	E	100.00
60	A	A	A	A	A	A	A	100.00
61	E	F or D	A or D	A or D	D or E	D	D	50.00
62	A	A	D	A	A	A	A	83.33

APPENDIX F--Continued

Item Number	Judges						Answer on Key	Percentage of Agreement
	I	II	III	IV	V	VI		
63	A	A	F	D	F	E	A	33.33
							F	33.33
64	D	A	F	E	D	A	A	33.33
							D	33.33
65	A	E	E	F	A	E or F	A	28.57
							E	42.85
							F	28.57
66	C	C	C	D	C	C	C	83.33
67	C	C	C	B	C	C	C	83.33
68	D	D	D	D	D	D	D	100.00
69	D	D	A	D	D	No response	D	80.00
70	B	B	B	C	B	B	B	83.33
71	B	B	B	B	B	A or C	B	71.42
72	D	D	D	B	D	A	D	66.66
73	C	C	C	C	C	C	C	100.00
74	A	A	A	A	A	A	A	100.00
75	D	D	D	D	D	D	D	100.00
76	C	C	C	B	C	C	C	83.33
77	A	A	D	D	D	D	D	66.66
78	B	B	B	B	B	B	B	100.00
79	A	A	A	A	A	A or D	A	85.71
80	C	C or A	C	C	C	C	C	85.71
81	A	A	A	A	A	A	A	100.00
82	A	A	A	A	A	A	A	100.00
83	B	B	B	B	B	B	B	100.00
84	B	B or A	B	B	B	B	B	85.71
85	B	A or B	A	A	D	B	A	42.85
							B	42.85
86	A	A	A	C	A	A	A	83.33

APPENDIX G

JUDGES' AGREEMENT ON ANSWER KEY FOR FORM B

Item Number	Judges						Answer on Key	Percentage of Agreement
	I	II	III	IV	V	VI		
1	A	A	A	A	A	A	A	100.00
2	A	A	A	A	A	A	A	100.00
3	D	D	D	D	D	D	D	100.00
4	D	D	D	D	D	D	D	100.00
5	A	B	B	A	A	D	A	50.00
6	A	A	A	A	A	D	A	83.33
7	D	D	D	D	D	D	D	100.00
8	C	C	C	C	C	C	C	100.00
9	D	D	D	D	D	D	D	100.00
10	D	D	D	D	D	A or D	D	85.71
11	B	B	B	B or A	B	B	B	85.71
12	D	D	D	D	D	D	D	100.00
13	B	C	C	D	B	C	C	50.00
14	A	A	A	A	A	A	A	100.00
15	C	C	C	C	C	C	C	100.00
16	A	A	A	A	A	A	A	100.00
17	C	C	C	C	B	C	C	83.33
18	C	C	C	C	C	C	C	100.00
19	A	A	A	A	A	A	A	100.00
20	No response	D	D	D	D	D	D	100.00
21	B	A	A	A	A	A	A	83.33
22	D	D	D	D	D	B	D	83.33
23	B	B	B	B	B	B	B	100.00
24	C	C	C	C	C	C or B	C	85.71
25	A	A	A	A	A	A	A	100.00
26	C	C	B	C	B	C	C	66.66
27	C	E	C	E	C	C	C	66.66
28	B	B or C	B	B	B	B	B	85.71
29	A	B	A	C	A	B	A	50.00

APPENDIX G--Continued

Item Number	Judges						Answer on Key	Percentage of Agreement
	I	II	III	IV	V	VI		
30	C	C	B	C	C	B	C	66.66
31	B	B	B	B	B	B	B	100.00
32	D	C	C	C	C	C	C	83.33
33	D	D	D	D	D	D	D	100.00
34	C	C	C	C	C	C or B	C	85.71
35	C	C	C	C	C	A or D	C	71.42
36	C	C	C	A	C	A	C	66.66
37	A	A	A	A	A	A	A	100.00
38	A	A	A	A	A	A	A	100.00
39	C	C	C	C	C	C	C	100.00
40	D	D	D	D	D	D	D	100.00
41	C	C	C	C	C	A or C	C	85.71
42	D	D	D	D	D	D	D	100.00
43	D	D	D	D	D	D	D	100.00
44	A	A	A	A	A	A	A	100.00
45	C	C	C	C	C	C	C	100.00
46	C	C	C	C	C	C	C	100.00
47	C	C	C	C	C	C	C	100.00
48	D	B	D	B	B	B	B	66.66
49	D	A	D	D	D	A	D	66.66
50	A	A	A	A	A	A	A	100.00
51	C	C	C	C	C	C	C	100.00
52	A	A	A	A	A	A	A	100.00
53	A	A	A	A	A	D	A	83.33
54	A	A	A	B	A	A or B	A	71.42
55	A	A	A	A	A	A	A	100.00
56	B	A	A	A	B	A	A	66.66
57	C	C	C	B	C	C	C	83.33
58	C	C	B	C	C	C or B	C	71.42
59	A	A	A	A	A	A	A	100.00
60	B	A	B	B	B	B	B	83.33
61	B	B or A	B	A or B	B	B	B	75.00
62	D	A	D	A	D	B	D	50.00

APPENDIX G--Continued

Item Number	Judges						Answer on Key	Percentage of Agreement
	I	II	III	IV	V	VI		
63	A	A	A	C	A	A	A	83.33
64	F	F	F	F,E or C	F	B or F	F	66.66
65	E	F or A	E	A	A	F or E	A E F	37.50 37.50 25.00
66	E	F	E	F or G	E	B	E	42.85
67	E or D	D	A	G	E	C	D E	28.57 28.57
68	B	B	B	B or C	B	B	B	85.71
69	C	C	B	E	C	C	C	66.66
70	D	D	D	D	D	D	D	100.00
71	B	C	C	C or D	C	C	C	71.42
72	E	E	A	E	E	No response	E	80.00
73	E	E	C	E	E	E	E	83.33
74	C	C	B	B	C	B	B C	50.00 50.00
75	D	C	D	C	D	D	D	66.66
76	A	A	A	A	A	A	A	100.00
77	A	D	A	C	D	A or D	A D	42.85 42.85
78	D	D	D	D	D	A	D	83.33
79	C	B	C	C	C	A	C	66.66

APPENDIX H

A COMPARISON OF ITEM DIFFICULTY INDICES OF EQUIVALENT ITEMS ON FORM A AND FORM B

Form A Item Number	Index Percentage	Form B Item Number	Index Percentage
1	56.0	21	50.0
2	41.4	25	81.7
3	34.1	6	47.5
4	68.2	43	79.2
5	75.6	31	90.2
6	32.9	4	42.6
7	57.3	24	52.4
8	20.7	9	15.8
9	69.5	35	87.8
10	69.5	10	62.1
11	73.1	11	60.9
12	41.4	32	63.4
13	30.4	2	69.5
14	47.5	37	50.0
15	64.6	42	47.5
16	39.0	41	76.8
17	50.0	38	50.0
18	73.1	3	76.8
19	19.5	39	25.6
20	39.0	36	20.7
21	50.0	13	57.3
22	73.1	45	82.9
23	40.2	16	45.1
24	87.8	33	82.9
25	52.4	44	19.5
26	29.2	40	46.3
27	93.9	46	97.5
28	17.0	48	71.9
29	68.2	7	51.2
30	50.0	12	46.3
31	19.5	15	29.2
32	56.0	22	35.3
33	91.4	19	89.0
34	62.1	14	52.4
35	47.5	17	25.6
36*	21.9	23*	26.8
37	41.4	18	39.0
38	82.9	47	80.4
39	53.6	8	43.9
40	50.0	5	15.8
41*	34.1	26*	41.4

*Duplicate Items

APPENDIX H--Continued

Form A Item Number	Index Percentage	Form B Item Number	Index Percentage
42*	10.9	27*	08.5
43*	34.1	28*	43.9
44*	35.3	29*	43.9
45	39.0	30	32.9
46*	31.7	34*	45.1
47	60.9	64	60.9
48	06.0	65	89.0
49	25.6	66	36.5
50	42.6	67	68.2
51	52.4	68	13.4
52	73.1	54	60.9
53	85.3	55	90.2
54	73.1	56	37.8
55	84.1	57	85.3
56	87.8	58	29.2
57	31.7]		
58	62.1]	1	93.9
59	59.7]		
60	71.9]		
61	14.6]		
62	40.2]		
63	19.5]	20	74.3
64	45.1]		
65	63.4]		
66*	58.5	69*	35.3
67*	18.2	71*	21.9
68*	26.8	73*	25.6
69*	41.4	72*	36.5
70*	26.8	70*	45.1
71	43.9	74	74.3
72	34.1	75	54.8
73	52.4	76	73.1
74	85.3	77	64.6
75	76.8	78	65.8
76	43.9	79	56.0
77	92.6	49	06.0
78	50.0	50	71.9
79	42.6	51	57.3
80	54.8	52	37.8
81	46.3	53	45.1
82*	73.1	59*	89.0
83	82.9	60	68.2
84	74.3	61	34.1
85*	60.9	62*	43.9
86*	41.4	63*	37.8

APPENDIX I

A COMPARISON OF THE ITEM DISCRIMINATION INDICES OF EQUIVALENT ITEMS ON FORM A AND FORM B

Form A Item Number	Index	Form B Item Number	Index
1	.14	21	.09
2	.09	25	.27
3	.36	6	.32
4	.23	43	.09
5	.59	31	.23
6	.45	4	.59
7	.14	24	.32
8	.27	9	.18
9	.18	35	.18
10	.18	10	.27
11	.36	11	.86
12	.41	32	.18
13	.23	2	.50
14	.18	37	.41
15	.41	42	.36
16	.50	41	.18
17	.23	38	.64
18	.09	3	.41
19	.00	39	.27
20	.14	36	.05
21	.23	13	.45
22	.50	45	.36
23	.14	16	.45
24	.23	33	.23
25	.41	44	.05
26	.14	40	.36
27	.09	46	.00
28	.18	48	.18
29	.59	7	.32
30	.59	12	.36
31	.41	15	.14
32	.55	22	.27
33	.00	19	-.05
34	.73	14	.36
35	.18	17	.05
36*	.09	23*	.27
37	.50	18	.55
38	.32	47	.41
39	.50	8	.50
40	-.18	5	.32
41*	.32	26*	.14
42*	.14	27*	-.09
43*	.11	28*	.45

*Duplicate Items

APPENDIX I--Continued

Form A Item Number	Index	Form B Item Number	Index
44*	.41	29*	.36
45	.14	30	.18
46*	.23	34*	.36
47	.32	64	.27
48	-.09	65	.14
49	.23	66	.32
50	.23	67	.32
51	.50	68	-.09
52	.23	54	.45
53	.09	55	-.05
54	.45	56	.09
55	.36	57	.05
56	.05	58	.09
57	.41]		
58	.09]		
59	.55]	1	.09
60	.36]		
61	.00]		
62	.18]		
63	.18]	20	.41
64	.27]		
65	-.14]		
66*	.59	69*	.14
67*	.27	71*	.14
68*	.23	73*	.41
69*	.32	72*	.41
70*	.14	70*	.36
71	.18	74	.32
72	.05	75	.09
73	.23	76	.05
74	.18	77	.14
75	.14	78	.05
76	.32	79	.05
77	.05	49	.05
78	.41	50	.23
79	.23	51	.68
80	.59	52	.27
81	.41	53	.14
82*	.77	59*	.32
83	.36	60	.36
84	.41	61	.36
85*	.50	62*	.09
86*	.27	63*	.36

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