THE DEVELOPMENT OF A STANDARDIZED INSTRUMENT FOR THE MEASUREMENT OF ACHIEVEMENT IN CLOTHING CONSTRUCTION AT THE SENIOR HIGH SCHOOL LEVEL

Thesis for the Degree of M.A.

MICHIGAN STATE UNIVERSITY

Sister Charles Miriam Walli, O.P.

1968

ABSTRACT

THE DEVELOPMENT OF A STANDARDIZED INSTRUMENT FOR THE MEASUREMENT OF ACHIEVEMENT IN CLOTHING CONSTRUCTION AT THE SENIOR HIGH SCHOOL LEVEL

by Sister Charles Miriam Walli, O.P.

Recognizing the fact that the evaluation of achievement is the final and necessary step of any educational process, the main objective of this study was to develop a standardized paper-and-pencil test which would satisfactorily measure the achievement level in clothing construction of senior high school students who were completing a two-semester clothing course. The reliability of the test was established to determine the extent to which the instrument was consistent in measuring student knowledge in the area of clothing construction.

High school curriculum guides and popular high school clothing textbooks were evaluated and were used as a guide when constructing the instrument. Clothing construction curriculum objectives were formulated and a table of specifications was developed to illustrate the percentage of textbook coverage allowed various objectives and subject content areas. An outline of test content was also prepared to help insure adequate coverage of the content areas and to aid in determining if the test meets the individual needs of a teacher.

College pretests were viewed in light of the established criterion; objective items which met the content and course objectives requirements were incorporated into the instrument being developed.

Twenty five true-false items formed the General Information part of the achievement test (Part I), and 75 multiple-choice items included Knowledge of Specific Facts and Common Terms (Part II) and Understanding of Principles and Generalizations (Part III). The multiple-choice items were of the four option variety. A total time limit of 50 minutes was established and a Manual of Directions and student directions were developed.

The instrument was administered to 359 high school clothing students from 11 school districts in Michigan and Illinois. The tests were scored and item and test analyses were made to determine the reliability of the instrument.

The adaptation of test items from college pretests proved to be satisfactory. All major content areas and objectives (which were included in curriculum guides for Michigan and Illinois and were included in popular textbooks and references in the area of clothing construction) were covered in the developed high school achievement test and an item analysis proved the effectiveness of the test items. Forty of the 100 test items were within the 41-60 range of discrimination with an item difficulty mean of 46. The ideal item is one with a difficulty rating of 50. The developed clothing construction test had only four items with an item difficulty index above 80 and 10 items below 20.

The discrimination power of the test was low with a mean of 25. Test items should have a discrimination index of at least 20 points; 40 of the items on the developed test had an index of less than 20, including five items with an index of less than zero.

The point biserial correlation mean is a correlation between the student performance on an item (right or wrong) and the test score.

It assumes that the test score distribution is normal and that the division on item performance is a natural dichotomy. The possible range of values is from +1 to -1 with .40 considered adequate and .50 considered exceptionally high. The correlation of .22 designated a positive degree of correlation. The Kuder-Richardson Formula #20 estimated the reliability of this clothing construction test as .80 which is within the accepted normal range.

The raw score distribution of the developed 100 item clothing construction test ranged from 84 to 28 with a mean of 53.64 and a standard deviation of 10.11. A normal bell-shaped curve was approximated with 68 percent of the total testing population receiving raw scores of 64 to 44.

This standardized test is designed to measure achievement in clothing construction of students in grades nine through twelve who are completing a two-semester clothing course. It was developed to measure scholastic aptitude and achievement only to the extent that the objectives of the teacher, curriculum and textbooks correspond to those outlined in this study; neither the test nor the norms can be considered valid if the objectives, curriculum guides or textbooks used by the teacher differ markedly from those outlined. The standard directions included in the Manual of Directions which accompany this standardized clothing construction test insure the valid use of the established norms.

The use of the test results may be many and varied, but the immediate purpose, upon which all ultimate uses depend, is to provide an objective and reliable measure of the educational achievement of the pupils tested.

THE DEVELOPMENT OF A STANDARDIZED INSTRUMENT FOR THE MEASUREMENT OF ACHIEVEMENT IN CLOTHING CONSTRUCTION AT THE SENIOR HIGH SCHOOL LEVEL

by

Sister Charles Miriam Walli, O.P.

A THESIS

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

MASTER OF ARTS

Department of Textiles, Clothing and Related Arts

1968

Printed in the United States of America.

ACKNOWLEDGMENTS

Many individuals have contributed ideas, time, interest, and encouragement to this study. The author wishes to acknowledge Dr. Mary Gephart, department chairman, who has generously shared her knowledge, time, and understanding in directing the study. Dr. Beverly Crabtree has given invaluable aid in the development of the instrument, and technical advice was received from Dr. Sarah Hervey which aided in the selection of the standardization population. Dr. Anna Creekmore and Dr. Gertrude Nygren have given helpful suggestions which were used in the completion of the thesis.

Numerous college clothing and textile departments offered their clothing pretests and publishing companies were generous in releasing sales data for use in this study. The assistance and cooperation of many high school clothing teachers and students were also essential to the study. Prompt and generous responses were characteristic of the participating schools.

Sincere appreciation is expressed to the Dominican Sisters, Adrian, Michigan, for their unfailing support, and to her family, the author also extends her gratitude.

TABLE OF CONTENTS

Page

LIST OF TABLES

CHAPTER I

INTRODUCTION

Statement of the Problem

Any educational process must include three steps: (1) a decision must be made as to what is to be learned, (2) instructional activities must be carried out, and (3) the achievement of the learner must be evaluated.[1] A teacher must have a clear idea of specific objectives that the pupils are to achieve and must guide the instructional activities of the classroom by combining knowledge of subject content, learning theory, and teaching methods. The evaluation of achievement will help the teacher to determine the degree to which the educational objectives have been achieved.

Evaluation instruments may be used in the area of clothing construction as a means of giving the teacher and pupil important information concerning pupil achievement. The information can serve as a guide for future instruction and study. If a clothing construction test is standardized, it provides norms which can be used for comparing the achievement of pupils in one clothing class with those of another. The comparison gives a teacher an evaluation of the general effectiveness of the instructional program and also provides a more realistic picture of the abilities of individual students by comparing the

---

[1]C. M. Lindvall, Testing and Evaluation: An Introduction (New York: Harcourt, Brace and World, Inc., 1961).

achievement of members of one class with that of a more broadly representative group. The information can be of great help when pupils transfer from one school to another or when individuals are counseled on educational and vocational plans.

Greater objectivity is another advantage of a standardized clothing test. The content, general style, and wording of the test items are not dependent on the judgment of the teacher and the administration and scoring of the test are also more objective. One final advantage is that the time saved from repeated test construction can be used by the teacher for other important purposes.

The purpose of this study is to evaluate already existing college pretests and adapt them into a standardized test which will satisfactorily measure achievement in clothing construction at the high school level. Illinois and Michigan were the states selected as the basis for the study so that a variety of textbooks and school systems would be represented.

Review of Literature

Numerous pretests have been developed for beginning clothing construction courses for use in institutions of higher learning. One of the first pretests, developed by Saddler[2] in 1945, was designed to section students into homogeneous groups. The test battery was composed of a paper-and-pencil section to determine the acquisition of information and a practical section to test sewing ability. The coefficients

---

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

of reliability of the two sections were .843 and .881, respectively, and the correlation of scores of the two sections was +.669 using the split score method and the Spearman-Brown formula.

Bray,[3] Davis,[4] Witt,[5] Gould,[6] and Hale[7] also designed clothing placement tests so that students might be sectioned into classes of various levels of training which would promote a better attitude toward clothing construction and higher achievement and interest in the course. Another pretest and questionnaire was designed by Semeniuk[8] and is given to all students entering home economics as freshmen at South Dakota State College. The results are used to adjust the teaching of beginning construction to meet student needs.

---

[3]Edyth Bray, "The Development and Use of a Pencil and Paper Test for Determining Placement of College Students in Clothing Courses and for Measuring Achievement after Instruction" (Unpublished Master's thesis, University of Minnesota, 1949).

[4]Mildred Jean Davis, "Clothing Placement Tests for Entering Freshmen in the Division of Home Economics at West Virginia University, 1948-1951, Inclusive" (Unpublished Master's thesis, West Virginia University, 1952).

[5]Mildred Bea Witt, "The Revision and Development of Selected Evaluation Devices for Appraising Certain Clothing Competencies of College Freshmen" (Unpublished Master's thesis, Oklahoma State University, 1961).

[6]Grovalynn Foremen Gould, "A Performance Pretest for Placement of College Students in Beginning Clothing Courses" (Unpublished Master's thesis, Oklahoma State University, 1963).

[7]Myrna Beth Hale, "Analysis of the 1960 and 1961 Oregon State Clothing Construction Placement Test" (Unpublished Master's thesis, Oregon State University, 1963).

[8]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).

Rothgarn[9] developed two equivalent evaluation instruments to test the ability of students to understand and apply specific principles of clothing construction prior to formal college instruction. The study was based on three course objectives and four course principles which had been specifically developed (for Principles of Clothing Construction) at Michigan State University. The coefficients of reliability, determined for Form A and Form B, were .734 and .732, respectively. The correlation coefficient of +.70 indicated a marked relationship between the two forms of the pretest. An experience questionnaire was also formulated to obtain information concerning previous clothing construction experience.

Numerous other pretests have been designed to measure student knowledge of clothing construction in particular institutions of higher learning. Pretests have been used by the institutions to exempt exceptional students from a beginning course, to place students in courses of an appropriate level, and to guide curriculum planning. Though usually developed to meet the needs of a particular institution, some selected pretests can be successfully used by other institutions if the tests meet the educational objectives of the institution and if the pretests are periodically scrutinized and revised so that they will continue to measure the current course objectives and principles.

A very limited number of clothing construction evaluation

---

[9]Mildred Marguerite Rothgarn, "The Development of a Method of Pretesting Student Ability to Understand and Apply Principles of Clothing Construction" (Unpublished Master's thesis, Michigan State University, 1962).

devices have been developed at the high school level. Frandolig[10] validated the use of three instruments to predict clothing construction ability. A "Finger Dexterity Questionnaire" was designed for junior and senior high school and a separate clothing construction pretest was developed for each of the two levels. Tables are used to convert raw scores to weighted scores and a classification system states whether a pupil is like that of the upper one-fourth, middle one-half, or lower one-fourth of other pupils of the same grade level. The classification system results were based on the abilities of over four hundred high school pupils in six Iowa schools. The tests can be used to estimate clothing construction ability as a basis for helping to select a first garment and to divide classes into ability groups for teaching.

Committees of the American Home Economics Association developed a series of Cooperative Tests in Home Economics. Each is available in two (the X and Y) forms. The Textiles and Clothing Test,[11] one of the four available in the series, deals with the selection of clothing, garment construction, the care and repair of clothing, and the selection and use of equipment. Suggested uses include using it as a pretest to determine the placement of new or transfer students or for testing at different levels to determine the extent of learning during specified periods of time or with different methods of instruction. The forms may be used for course examinations if the content corresponds to that

---

[10]Carol H. Frandolig, "Validation of Three Instruments to Predict Clothing Construction Ability at the High School Level" (Unpublished Master's thesis, Iowa State University, 1962).

[11]Textiles and Clothing Test, Cooperative Tests in Home Economics, Prepared by Committees of the American Home Economics Association (Princeton, New Jersey: Educational Testing Service, 1948-1952).

covered by either of the two test forms.

The Clothing: Every Pupil Scholarship Test[12] is also available for use on the high school level. A new form of the test has been issued yearly, usually in April, since 1927, and norms are made available following the testing program.

Chadderdon[13] has prepared evaluation materials for ninth and tenth grade clothing units as part of the Home Economics Research Program at Iowa State University. Unit objectives are included with the test booklets to assist the teacher in determining whether or not the instruments would validly measure specific educational objectives.

Purdue University recently prepared six tests for junior and senior high school courses in home economics. The authors, experienced high school teachers who are presently in the Department of Home Economics at Purdue, used personal classroom experience, suggestions and recommendations from other teachers, and an analysis of the content of several widely used texts to insure a balanced coverage of the topics most commonly taught in home economics classes. The Clothing I Test[14] has two forms available for high school use. The topics included in each test, arranged in order of decreasing emphasis, are construction,

---

[12] Clothing: Every Pupil Scholarship Test (Emporia, Kansas: Bureau of Educational Measurements, Kansas State Teacher's College, 1927-68).

[13] Hester Chadderdon, Evaluation Materials: Ninth Grade and Tenth Grade (Home Economics Research Program, Iowa State University, Project 1415, 1961).

[14] Clothing I Test, Six New Tests for Junior and Senior High School Courses in Home Economics, Prepared by the Department of Home Economics at Purdue (Lafayette, Indiana: Measurement and Research Center, 1967).

color and texture, fabrics and textiles, care of clothing, consumer buying, line and design, and equipment. The Clothing II Test,[15] available for advanced high school students, included test items in the areas of fabrics and textiles, construction, machine care and operation, consumer buying, pattern design and selection, and alterations and cutting. The listed topics are again arranged in order of decreasing emphasis. Each of the three tests has 100 questions and a time limit of 40 or 50 minutes. Norms and technical descriptions are being prepared and should be available for use in the 1968-69 school year.

From a review of studies undertaken concerning evaluation devices for high school clothing construction courses, two conclusions appear to be warranted: (1) few evaluation devices exist in the area of clothing construction, and (2) to date, no data is available on the reliability or validity of any of the existing devices. Arny[16] suggests several reasons for these facts: (1) the published evaluation devices are often general in nature, having been planned to cover the major aspects of the field, and cannot be adapted to local situations; (2) they may not emphasize the goals which are deemed of most importance in a particular school; (3) if general norms have been established, they may not be applicable, especially for sub-average or superior groups; (4) tests in all areas of home economics must be kept up to date because the content that is being taught and the relative emphasis on different aspects of the work are constantly shifting.

---

[15]Clothing II Test, ibid.

[16]Clara Brown Arny, Evaluation in Home Economics (New York: Appleton-Century-Crofts, Inc., 1953), p. 70.

Fleck states that "home economics teachers use a wide range of procedures and devices to determine student growth, but the outcomes have not always brought satisfaction."[17] The evaluation devices have not always measured the extent to which the educational goals were realized and do not require a variety of thinking - comprehension, application, analysis, and judgment. Nor have the instruments always distinguished the excellent, superior, and average students. Realizing both extremes of the problem, an attempt should be made to develop a valid instrument for the measurement of student achievement in clothing construction.

Travers[18] has made several suggestions and recommendations for the development of any published test which would measure some particular skill. He states that an accompanying manual should describe clearly just when the test can be appropriately used. It should include necessary information for the interpretation of test scores and should indicate the kinds of inferences that can be made from the test scores and the basis on which such inferences can be justified. The test should be known to have adequate reliability in the situation in which it is to be used and procedures for administering the test should be included to help insure the reliability of the test.

Definition of Terms

Various terms used in this study need to be defined in order to

---

[17]Henrietta Fleck, "Evaluation in Practice," Journal of Home Economics, XLVI (May, 1954), p. 300.

[18]Robert M. W. Travers, Educational Measurement (New York: The Macmillan Company, 1955), p. 116.

show the scope of the definition and to prevent possible ambiguity in terminology.

In this study, the instrument is a standardized paper and pencil test which has been developed from pre-existing college pretests. Measure refers to a comparative measurement based on the commonly accepted Stanine Scale.[19] Achievement refers to the amount of knowledge gained as compared with other students as measured by the instrument.

Clothing construction content was selected from the clothing textbooks and references most widely used by high schools. Questions about textiles, line, and design were used only when such information directly affected clothing construction procedures. The standardization population included over 300 students in grades nine through twelve who were completing a two-semester clothing course for the first time. All students were enrolled in schools in Michigan and Illinois. In this study, senior high school level refers to grades nine through twelve.

Focus of Study

"Evaluation is a process of judging the extent to which educational goals are realized. It must be an integral part of teaching and learning."[20] Home economics educators realize the need for adequate and accurate educational evaluation, but are not always successful in accomplishing the task. Informal teacher-made tests are often invalid measurements of achievement and standardized instruments are at a minimum,

---

[19]C. M. Lindvall, Testing and Evaluation: An Introduction (New York: Harcourt, Brace and World, Inc., 1961), p. 371.

[20]Henrietta Fleck, "Evaluation in Practice," Journal of Home Economics, XLVI (May, 1954), p. 301.

particularly on the high school level. Standardized instruments that do exist neglect to state appropriate uses or do not indicate the reliability of the instruments. There is a need for the development of a standardized test which will satisfactorily measure achievement in clothing construction at the high school level.

The assumptions and objectives which guided this study are as follows:

Assumptions:

1. Much of the information contained in college pretests is fundamentally the same as the knowledge that should have been acquired at the end of a high school Clothing I course.
2. A standardized clothing construction test can be effectively used in appraising a teacher's instructional program.
3. A standardized clothing construction test will give a realistic picture of the abilities of individual students.

Objectives:

1. To adapt clothing construction test items from existing college pretests into test items which include areas of content generally included in high school clothing curriculum guides for Michigan and Illinois.
2. To develop a standardized pencil-and-paper test which will satisfactorily measure the achievement level in clothing construction of senior high school girls who are completing a two-semester clothing course.
3. To establish the reliability of the standardized clothing construction test.

CHAPTER II

METHODOLOGY

Selection of the Method

For obtaining information about clothing construction tests, types of tests previously used for similar studies were reviewed. A paper-and-pencil test was selected for several reasons: (1) they can be objective and dependable; (2) they are economical of time and easy to administer; (3) norms can be provided against which to compare a given class; and (4) they can be scored in standard scores.[1]

The fact should be emphasized that an objective paper-and-pencil test provides only one type of information about the needs, achievement, and interests of students. Such tests usually concentrate on measurement of information and of academic skills whereas informal methods of evaluation (such as progress reports, observations in the laboratory situation, final projects, and check list evaluations of constructed projects) are reserved for judging the ability to think, attitudes, and work habits. In home economics courses, informal evaluations are often necessary because of the unique character of some classroom objectives and the methods employed in attaining them.

Because far too little attention has been paid to achieving great objectivity and dependability in teacher ratings or the assessment

---

[1]J. Stanley Ahmann and Marvin D. Glock, Evaluating Pupil Growth (Boston: Allyn and Bacon, Inc., 1958), pp. 351-52.

of pupil projects,[2] the greater assurance of objectivity and reliability in objective tests can be used to advantage. The teacher can use the test results to form a valuable part of the informational background needed for student guidance. Objective test results are only a part of the informational background, however, and should be interpreted in conjunction with information from many other sources.

True-false and multiple-choice test items were selected as the forms to use in the objective test. A wide sampling of knowledge is possible when using both types as many items can be answered within a given time, and almost any area of content can be used. A well constructed true-false item usually shows discrimination thereby indicating the range of abilities within a class group. It is possible to set up a key in which there is reasonable agreement if statements which are not wholly true or wholly false are avoided.[3]

Recognizing the fact that true-false test items foster guessing when students do not know the content covered, 75 percent of the test items in the instrument being developed were of the multiple-choice variety. Well constructed multiple-choice items are likely to be discriminating and, when four options are present, guessing can be practically eliminated.[4] All options must be relevant and plausible with only one correct answer or one that is better than the others.

---

[2]Hilda Taba, Curriculum Development: Theory and Practice (New York: Harcourt, Brace, and World, 1962), p. 330.

[3]Hazel M. Hatcher and Mildred E. Andrews, The Teaching of Home Economics (Boston: Houghton Mifflin Company, 1963), p. 249.

[4]Ibid, p. 255.

The test items were selected from a wide variety of existing pretests in clothing construction.[5] Several points can be presented in support of this decision. Clothing construction pretests are often given to incoming college freshmen as a basis for exemption from a beginning course. Consequently, the general level of difficulty of the test items is like that of pre-college education rather than information tested in advanced college courses in clothing construction.

Besides a similarity in levels of difficulty in a high school final achievement test and a college pretest, a study of test items included in college pretests shows the relative emphasis generally given to the various subject content areas. When this observation is combined with the knowledge of objectives and subject content areas usually included in widely used high school clothing textbooks and in curriculum guides, test items could be selected which would provide for the assessment of what is generally expected to be taught in high schools.

Although extensive consideration was given to the selection of each test item, considerable time was saved by not having to construct each original test item. Given specific knowledge to be tested, a limited number of ways seem to exist for stating a test item to illicit a response which would give evidence that the knowledge had been acquired. Valuable time was saved by selecting a variety of existing items which suited particular needs.

To avoid any plagiaristic implications, several vital statistics can be presented. Twenty existing college pretests were reviewed

---

[5]See Appendix A, p. 45, for letter sent to colleges requesting college pretests, and Appendix B, p. 48, for listing of selected colleges using clothing construction pretests.

for use in this study. Fifteen were objective paper-and-pencil tests and five were practical or proficiency tests. Of the 1130 test items included in the 15 objective tests, 100 were selected for use as original test items in the high school achievement test being developed. After the developed high school achievement test was pretested and the item analysis was reviewed, all of the 100 questions were changed from their original form so that the level of difficulty or the discrimination power might be made more satisfactory in the final test. The final content of the test was similar to that found in the variety of available college pretests but the phrasing of the test items and the multiple choice options were modified or changed after analysis of the pretest results.

Development of the Instrument

Three steps can be outlined for the construction of a paper-and-pencil achievement test, namely, (1) identifying educational objectives that have verbal aspects, (2) developing a table of specifications which reflects the relative importance of the objectives, and (3) selecting the test items on the basis of the table of specifications.[6] Since the achievement test being constructed was to be standardized, great care was exercised in the preliminary planning and selection of content to insure the validity and reliability of the test form. State curriculum

---

[6]Ahman and Glock, op. cit., p. 353.

guides for Michigan[7] and Illinois[8] were reviewed so that curriculum objectives could be formulated which would be representative of the curriculum objectives of schools for which the test was being designed. The objectives were used as a guide when constructing the instrument and were included in the manual of directions to aid the examiner in understanding the scope of the test and to determine if the test suited the needs of the examiner. The following clothing construction curriculum objectives were formulated after reviewing Michigan and Illinois home economics curriculum guides:

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

A. Understanding of terms used in construction.
B. Ability to identify sewing machine parts and their uses.
C. Ability to select sewing equipment and use it properly.
C. Ability to select patterns, fabrics, and garments considering line, choice, and figure proportions.

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

A. Ability to alter patterns.
B. Understanding of a pattern and processes which will be required to complete the garment.
C. Ability to interpret directions for various processes used in clothing construction.
D. Ability to construct garments using good management practices.
E. Ability to develop short cuts for construction processes.

---

[7] Resource Materials for Home Economics Teachers to Use as a Guide in Developing Local Programs in Homemaking and Family Life Education (Michigan Department of Education, 1965), pp. 22-29.

[8] Home Economics Education: Homemaking Aspect (Springfield, Illinois: Illinois Curriculum Program, Office of the Superintendent of Public Instruction, 1966), pp. 157-170.

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

A. Recognition of good fit in garments.
B. Ability to evaluate the quality of the garments constructed in terms of acceptable criteria.

Letters of request (see Appendix C, p. 52) were sent to thirteen large publishing companies asking names of textbooks which appeared to be preferred for use in clothing construction units at the high school level. Also requested was the number of texts which were ordered during 1966-67 for use in high schools. Table 1 (pp. 17-18) summarizes the information received from the various publishing companies.

Data received from publishing companies indicated that The Bishop Method of Clothing Construction,[9] Clothing Construction and Wardrobe Planning,[10] Simplicity Sewing Book,[11] and Guide to Modern Clothing[12] were the four most widely used clothing textbooks.[13] Clothing construction content was analyzed in each of the four textbooks and a table of specifications was developed to illustrate the percentage of coverage allowed various objectives and subject content areas (see Table 2, p. 19).

---

[9]Edna Bryte Bishop and Marjorie Stotler Arch, The Bishop Method of Clothing Construction (Philadelphia: J. B. Lippincott Company, 1966).

[10]Dora S. Lewis, Mabel Goode Bowers, and Marietta Kettunen, Clothing Construction and Wardrobe Planning (New York: The Macmillan Company, 1960).

[11]Simplicity Sewing Book (New York: Simplicity Pattern Co., Inc., 1965).

[12]Mary Mark Sturm and Edwina H. Grieser, Guide to Modern Clothing (St. Louis: Webster Division, McGraw-Hill Book Company, 1962).

[13]No data was available on several other popular textbooks.

TABLE 1.--Publisher's report on clothing construction textbook and reference book preferences as indicated by the number of books ordered during 1966-1967

Publishing Company	Books Available for Use in Clothing Construction: Name	Author	Publication Date	Number of Books Ordered during 1966-1967
Chas. A. Bennett Co., Inc.	Homemaking for Teenagers, Book 1	McDermott; Nichols	1966	No Reply
	Custom Tailoring for Homemakers	Beck, Doris	1964	"
	Dress	Oerke, Bess	1960	"
	Tailoring Suits the Professional Way	Poulin, Clarence	1952	"
	Designing Dress Patterns	Tanous, Helen	1951	"
The Bruce Publishing Co.	How to Sew Leather, Suede, Fur	Schwebke; Krohn	1966	Not Available
	How to Tailor	Schwebke, Phyllis	1965	"
Burgess Publishing Company	Flat Pattern Methods	Hollen, Norma	1965	5,768
	Let's Alter Your Pattern	Sonneland, Yvonne	1963	1,703
	It's So, Sew Easy	Bancroft, Vivian	1962	6,456
Ginn and Company	Experiences with Clothing	Pollard, L. Belle	1965	3,500
D.C. Heath and Company	Clothes for Teens	Todd; Roberts	1963	Not Available
Houghton Mifflin Company	Fashion Your Own	East; Wines	1964	1,566[a]
	Fashion and Fabrics	Rathbone, Lucy	1962	4,955[a]

[a]Figures represent sales in a district of fourteen states.

TABLE 1--Continued

Books Available for Use in Clothing Construction				
Publishing Company	Name	Author	Publication Date	Number of Books Ordered during 1966-1967
The Interstate	Tips and Tricks for Sewing	Jones, Frances	1964	No Reply
J.B. Lippincott Company	The Bishop Method of Clothing Construction	Bishop; Arch	1966	70,000
Webster Division McGraw-Hill Book Company	Guide to Modern Clothing	Sturm; Grieser	1962	+25,000
The Macmillan Company	Clothing Construction and Wardrobe Planning	Lewis; Bowers; Kellunen	1960	63,456
Educational Book Division Prentice-Hall, Inc.	Tailoring for the Family	Goodman	1964	No Reply
Scott Foresman Company	None Available			
Simplicity Pattern Company	Simplicity Sewing Book	Simplicity Pattern Company	1965	1,000,000

TABLE 2.--Table of Specifications illustrating the percentage of information allowed to clothing construction objectives and subject areas in four widely used books[a]

Subject Content Areas	Percentage of Information Allowed Various Textbook Objectives					
	Knowledge of Common Terms %	Knowledge of Specific Facts %	Understanding of Principles and Generalizations %	Application of Principles and Generalizations %	Interpretation of Charts and Illustrations %	Total
Construction Methods	2	2	2	12		18
Sewing Equipment	2	1				3
Hand Sewing				1		1
Machine Sewing	1	2	2	1		6
Pressing	1		1	2		4
Handling Fabrics	1	2	3	4		10
Using Pattern	1	1	2	1	1	6
Fitting Clothes			5	8		13
Blouses; Shirts				9		9
Skirts			1	6		7
Dresses; Jumpers				7		7
Coats; Jackets			1	15		16
Total	8	8	17	66	1	100[b]

[a] Edna Bryte Bishop and Marjorie Stotler Arch, The Bishop Method of Clothing Construction (Philadelphia: J.B. Lippincott Company, 1966).

Dora S. Lewis, Mabel Goode Bowers, and Marietta Kettunen, Clothing Construction and Wardrobe Planning (New York: The Macmillan Company, 1960).

Simplicity Sewing Book (New York: Simplicity Pattern Co., Inc., 1965).

Mary Mark Sturm and Edwina H. Grieser, Guide to Modern Clothing (St. Louis: Webster Division, McGraw-Hill Book Company, 1962).

[b] Total clothing construction information in the four textbooks was 880 pages.

After the analyses of curriculum guides and textbooks and the formulation of test objectives, an outline based on the survey of materials was prepared suggesting a weighted distribution of test items for the content areas of the achievement test being developed:

Content areas:	Proposed Number of Test Items
Technical knowledge of equipment	2
Sewing machine operation	6
Threading the machine	
Testing tension	
Testing correct stitch length	
Securing thread ends	
Pattern selection	6
Types	
Taking individual measurements	
Pattern markings	8
Judging fit of pattern	2
Pattern alteration	9
Techniques	
General guides in alteration	
Layout, cutting, and marking	8
Preparation of fabric	
Planning the layout	
Cutting	
Marking	
Fabric terms	5
Fabric selection	3
Type related to style of garment	
Suitability of type to individual's construction skills	
Steps in garment construction	4
Staystitching	
Sequence	
Unit method	
Lining, underlining, and interfacing	5
Purpose	
Sequence	
Cutting	
Handling darts, curves, and corners	5
Stitching concave and convex curves	
Stitching and finishing corners	
Darts	
Temporary construction: basting	2
Types	
Techniques	
Seams	5
Types	
Uses	
Techniques	

Content areas--continued:	Proposed Number of Test Items
Seam finishes	5
Types	
Uses	
Techniques	
Pressing techniques	2
Buttonholes	5
Types	
Placement	
Techniques	
Finishing	
Facing techniques	1
Zippers	3
Types	
Techniques	
Waistband treatment	1
Hems	4
Types	
Techniques	
Belt techniques	1
Sleeves	3
Types	
Techniques	
Analyzing fit of garment	2
Standards of clothing construction	3
Total Test Items	100

All of the aforesaid information was submitted to authorities in the education and clothing departments of Michigan State University for criticism and suggestions. Revisions were made in accordance with the suggestions of the critics and the judgment of the investigator.

A careful selection of test items was made in accordance with the curriculum objectives, the table of specifications, and the test outline. The test items were submitted to authorities for criticism and a revision of some test items, especially inaccuracies and technical flaws, was completed in view of the suggestions received. The items were assembled into a pretest form followed by the preparation of teacher and pupil directions.

Selection and Description of the Sample

The purpose of the paper-and-pencil clothing construction test was to objectively measure the achievement level of high school students who were completing a two semester clothing course. Students from Michigan and Illinois were tested assuring the representation of a variety of textbooks and school systems.

A time limitation demanded that a pretest sample be selected which would most nearly represent the population for whom the clothing construction test was designed. The pretest was administered to all students enrolling in Principles of Clothing Construction[14] at Michigan State University, East Lansing, and in Clothing II at Madonna High School in Aurora, Illinois (a total of 159 students). The tests were administered during the first week of the fall school term, 1967, before much information was gained in the course in which the students were presently enrolled. Each student was also asked to state how much clothing course work she had taken in previous high school courses: (1) one semester, (2) two semesters, (3) more than two semesters, or (4) none. All students meeting the pretest requirement of two semesters of a high school clothing course were used as the purposive sample. Seventeen students from Michigan State University and twenty students from Madonna High School met the requirement and were used as the pretest sample.

The sample was considered valid because each student used in the sample had completed a two semester clothing course in high school,

---

[14]The beginning clothing construction course offered to freshmen at Michigan State University.

students enrolled in Michigan and Illinois school systems were represented, and no personal preference or individual judgment entered into the decision of which of the tested students would be included in the sample.

The Pretest

The clothing construction pretest was administered to 159 students in two schools during the first week of the fall school term, 1967. Standard directions were used to help insure uniformity in teacher directives, student directions, and time limitations. Michigan State University answer sheets were used to help insure uniformity and to simplify the test analysis processes. The answer sheets of the 37 students who met the requirements of the purposive sample were separated from the remaining answer sheets and were sent to the Office of Evaluation Services and the Data Processing Department at Michigan State University for scoring and an item and test analysis.

The Data Processing Department divided the students in the purposive sample into an upper, middle, and lower group on the basis of the test scores. The division was essential in providing information concerning the operation of the distractors, or incorrect options, and to compute the index of discrimination. The upper and lower groups each contained 27 percent of the total pretest sample because optimal item discrimination can be obtained when using this division of groups.[15]

A number of item statistics were reported by the Data Processing Department which aided in the evaluation of each item. The index of

---

[15]Ahmann and Glock, op. cit., p. 192.

difficulty, or percentage of the total sample who answered the item incorrectly, indicated whether the item was too difficult (by a high index or value) or too easy (by a low index or value).[16] Table 3 summarizes the distribution of item difficulty indices of the clothing construction pretest:

TABLE 3.--Pretest summary data on the distribution of item difficulty indices

Item Difficulty Index[a]	Number of Pretest Items
81 - 100	3
61 - 80	9
41 - 60	14
21 - 40	34
00 - 20	40
Total Test Items	100

[a] $P=\frac{N^w}{Nt}(100)$ where P = percentage of pupils who answered the item incorrectly
N^w = number of pupils who answered the test item incorrectly
N^t = total number of pupils who took the test

Three of the test items were answered incorrectly by 81 to 100 percent of the sample while 40 items were answered incorrectly by zero to 20 percent of the sample. The item difficulty mean was 30. Because most test constructors desire items with indices of difficulty from 50 to 60, the mean difficulty of the test indicated that the level of difficulty was often too low (too easy).

The index of discrimination is the difference between the percentage of high achieving students (upper 27 percent) who answered the item correctly and the percentage of low achieving students (lower 27

[16] Ibid., p. 189.

percent) who answered the item correctly. While the discrimination index may range from 100 to -100, the range is generally between -20 and 50. The higher the index, the more satisfactory the test item can be considered, though it is unusual for an index to exceed 70. An item discrimination index of at least 20 is desired for general classroom tests.[17]

Table 4 summarizes the distribution of discrimination indices of the clothing construction pretest:

TABLE 4.--Pretest summary data on the distribution of discrimination indices

Discrimination Power Index[a]	Number of Pretest Items
81 - 100	0
61 - 80	6
41 - 60	20
21 - 40	34
00 - 20	33
Less than 00	7
Total Test Items	100

[a] $D=\frac{U-L}{N}$ where D = index of item discriminating power
U = number of pupils in upper group who answer the test item correctly
L = number of pupils in the lower group who answer the test item correctly
N = number of pupils in each of the two groups

Six of the test items had a discrimination index between 61 and 80 indicating that many more high achievers than low achievers were able to determine the correct answers. Seven of the test items had a discrimination index of less than zero indicating that more low achievers

[17] Ibid., p. 192.

than high achievers answered the items correctly, possibly because of ambiguity of wording, low level of difficulty, or an incorrect designation of the 'right' answer by the teacher. The item discrimination mean was 24; many test items were too easy and therefore failed to discriminate between the high and low achievers.

The item analysis of the clothing construction pretest indicated that 40 percent of the test items were too easy and/or failed to discriminate between the upper and lower groups of students. When the item difficulty was low, the discriminating power of the test item was often low, too. In such cases, more specific or more difficult information was asked in the revised test items. In the multiple choice test items, responses that were never chosen (and therefore poor distractors) were made more appealing in an attempt to attract the low achieving group of students while the high achievers would still recognize the distractors as being incorrect. When the test item was extremely difficult (with a difficulty index of +80) but seemed to discriminate well, the item was considered satisfactory and was not changed. An attempt was made to make the 40 test items with an item difficulty index of less than 20 more difficult, and the 40 test items with an index of discrimination of less than 20 also more difficult and, consequently, more discriminating. A further attempt was made to have most test items within the 40 to 60 range of difficulty.

The Kuder-Richardson Formula #20, used in determining the reliability of this test, is considered by many specialists in educational measurement to be the most satisfactory method of determining reliability and is being used to an increasing degree to determine the reliability of

standardized tests.[18] The proportions of students passing and failing each test item are used to estimate the reliability of the test on the basis of the consistency of the student performance from test item to test item within the instrument. This method of rational equivalence does not require the calculation of a correlation coefficient.

There is no single minimum size that a coefficient of reliability must reach for the test to be considered reliable, since the minimum size changes with the purpose for which the test scores are to be used. Kelly[19] established .50 as the minimum correlation necessary if the level of group accomplishment is to be evaluated and .94 as the minimum if the level of individual accomplishment is to be evaluated. A coefficient of at least .80 is found on most standardized tests.

The Kuder-Richardson Formula #20 was used to determine the reliability of the clothing construction pretest and a correlation of .83 was established. This was considered satisfactory for the test being developed. The standard error of measurement was 3.95 and was also considered to be satisfactory.

Selection and Description of the Standardization Population

The revised form of the clothing construction test was standardized using students from small villages, towns, and large cities in Michigan and Illinois so that a variety of school systems would be represented. In preparation for the selection of the standardization

---

[18] Ibid., p. 333.

[19] Truman L. Kelly, Interpretation of Educational Measurements (Tarrytown, New York: Harcourt, Brace, and World, Inc., 1927), p. 335.

population, state census data was reviewed which is summarized in Table 5:

TABLE 5.--Population Distribution in villages, towns, and cities in Michigan and Illinois[a]

Population of Villages, Towns, Cities	Michigan Population	Illinois Population	Total Population
Under 3,999	551,782	797,990	1,349,772
4,000 to 9,999	3,052,011	2,905,787	5,957 798
10,000 to 59,999	1,558,207	2,291,743	3,839,950
Over 60,000	2,971,000	4,471,500	7,442,500
Total Population (1964 est.)	8,133,000	10,457,020	18,590,020

[a]Statistical Abstract of the U.S.: 1964. Prepared under the direction of Edwin D. Goldfield, U.S. Dept. of Commerce (Washington, D. C.: Superintendent of Documents, U.S. Govt. Printing Office, 1964).

The population statistics were used to establish a Percentage Distribution table which was the guide used when selecting a weighted cross section of villages, towns, and cities in Michigan and Illinois:

TABLE 6.--Percentage Distribution of total population in Michigan and Illinois: used as the percentage of the standardization population which would be selected from the population level of Michigan and Illinois

Population of Villages, Towns, Cities	Percentage of Total Population[a] Michigan	Illinois	Total Percentage
Under 3,999	3	4	7
4,000 to 9,999	16	16	32
10,000 to 59,999	9	12	21
Over 60,000	16	24	40
Total Percentage	44	56	100

[a]Percentage of total population of Michigan plus Illinois.

Twenty five high schools were purposively selected based on the percentage distribution of the total population in Michigan and Illinois (see Table 6). The 25 high schools were sent letters[20] stating the nature of the research and requesting that the clothing construction test be given to high school students who were completing a two semester course in clothing. A further request was made to return the enclosure which would state the number of students meeting the course requirement and whether or not a 50 minute testing period could be scheduled before May 15, 1968. Twenty two schools responded and a total of 771 students were made available for testing.

A total of 429 students from 11 schools were selected[21] for the standardization population. Table 6 was used to determine the percentage of students which were selected from each of the village, town, and city population levels in Michigan and Illinois. As a result, a weighted cross section of locales (and school systems) were included in the selected testing population.

Several secondary determinants were also used in the selection of the testing population. To guard against the possibility of a teacher selecting her "better students" only, the total number of tests requested were sent to the teacher. An assurance of a normal range of achievement levels within each class or school was obtained in this manner. The three week time limit in which all the test were to be administered necessitated the use of the earliest replies which met the Percentage Distribution

---

[20]See Appendix D, p. 55.

[21]See Appendix E, p. 58, for listing of schools from which the standardization population was selected.

requirements (Table 6) for the standardization population.

Administration of the Instrument

Standard directions,[22] test booklets,[23] answer sheets, a letter of directives,[24] and a stamped, self-addressed envelope were sent to each of the selected schools. The test were administered May 4-15, 1968, by the clothing instructors in the selected schools using standard directions and answer sheets, and an established time limit of 50 minutes. Of the 429 tests requested by the teachers, 359 were returned. The main reason given for the difference of 70 was absenteeism; one teacher had carelessly included 20 Clothing II students in her original request number. A population loss had been expected, however, and the final total of 359 was within the established minimum of 300 for the final standardization population.[25]

Method of Analysis of Test Data

The answer sheets of the standardization population were scored by the Office of Evaluation Services at Michigan State University. As the answer sheets were scored, punched cards were processed which contained the score of each student and individual responses to each test item.

---

[22]The Manual of Directions is an essential part of this instrument. Plans are being made to publish the manual and the standardized test at the completion of this research.

[23]See Appendix F, p. 61.

[24]See Appendix G, p. 78.

[25]Frederick B. Davis, Educational Measurements and their Interpretation (Belmont, California: Wadsworth Publishing Company, Inc., 1964), p. 333. Davis states that the use of normalized scores is justified if the number of cases in the sample is large--200 or more.

The punched cards were sent to the Data Processing Department at Michigan State University where item analysis information, including item difficulty and discrimination power of each test item (see pp. 24-25 for formulas), was computed. The point biserial correlation coefficient, which is a correlation between student performance on an item (right or wrong) and test score, was computed for use as a further indicator of item discrimination.

Item analysis data was summarized and included in the item analysis print-out. The distribution of item difficulty indices showed the number and percentage of items whose difficulties were in each of five categories, ranging from a very easy category (00-20) to a very difficult category (81-100). The distribution of discrimination indices were tabulated in the same manner, except that a category was included for negatively discriminating items.

The mean item difficulty was determined by adding all of the item difficulty indices and dividing by the total number of items. The mean item discrimination and mean point biserial correlation were determined in a similar manner.

Test reliability, estimated by the Kuder-Richardson Formula #20, was given to illustrate the extent to which the test yields information that is consistent. The final test statistic was the standard error of measurement which is a common device for interpreting the reliability of a test.

Stanine scores were computed which could be used by the teacher to evaluate the levels of achievement and to interpret the test data to students and parents. In the stanine scale, raw scores were converted to a nine point scale, with a mean of five and a standard deviation of two.

The stanines can be obtained by assigning stanine scores sequentially to raw scores which have been ranked and tallied. The following distribution was used:

Stanine Scores	1	2	3	4	5	6	7	8	9
Percentage at each level	Lowest 4%	Next lowest 7%	Next lowest 12%	Next lowest 17%	Middle 20%	Next highest 17%	Next highest 12%	Next highest 7%	Highest 4%

The stanine score gives a comparison in terms of the difference between a student score and the group average or mean, and a comparison in terms of the rank of the scores of a student within a group of all students tested. Stanines distinguish nearly the same level of achievement as the deciles and are favored by some educators because the coarseness of the unit reduces the chance of parents or students overgeneralizing on the basis of small differences in the raw scores. The established stanine scale was included on the answer sheet for the convenience of the teacher.

CHAPTER III

THE STANDARDIZED CLOTHING CONSTRUCTION TEST RESULTS

The clothing construction test results were based on the 100 item test which was administered to 359 high school students in Michigan and Illinois who were completing a two semester clothing course. Table 7 lists the final standardization population (based on the percentage distribution figures in Table 6, p. 28):

TABLE 7.--Distribution of total population used to standardize the clothing construction test

Population of Villages, Towns, Cities	Number of Students		Total Number of Students
	Michigan	Illinois	
Under 3,999		26[a]	26
4,000 to 9,999	76	42	118
10,000 to 59,999	35	41	76
Over 60,000	41	98	139
Total Number of Students	152	207	359

[a]This population was not distributed between Michigan and Illinois because of the strong possibility of teachers selecting "only the better students" rather than an entire class group.

Test Score Distribution

The raw score distribution range was 84 to 28 with a mean of 53.64. Table 8 lists each score arranged in descending order under the heading "Raw Score." The number of students who received each score appears under the heading "Frequency." The number of students scoring at

TABLE 8.--Raw score distributions of the clothing construction objective test

Raw Score	Frequency	Cumulative Frequency	Percentile Rank	Standard Score
84	1	1	99	80.0
77	2	3	99	73.1
75	2	5	99	71.1
74	4	9	98	70.1
73	2	11	97	69.1
72	1	12	97	68.2
71	3	15	96	67.2
70	5	20	95	66.2
69	8	28	93	65.2
68	9	37	91	64.2
67	7	44	89	63.2
66	5	49	87	62.2
65	7	56	85	61.2
64	5	61	84	60.2
63	13	74	81	59.3
62	7	81	78	58.3
61	11	92	76	57.3
60	7	99	73	56.3
59	10	109	71	55.3
58	10	119	68	54.3
57	19	138	64	53.3
56	17	155	59	52.3
55	16	171	55	51.3
54	12	183	51	50.4
53	11	194	47	49.5
52	14	208	44	48.5
51	14	222	40	47.5
50	13	235	36	46.5
49	12	247	33	45.5
48	9	256	30	44.5
47	14	270	27	43.5
46	9	279	24	42.5
45	11	290	21	41.6
44	10	300	18	40.6
43	12	312	15	39.6
42	5	317	12	38.6
41	7	324	11	37.6
40	4	328	9	36.6
39	6	334	8	35.6
38	4	338	6	34.6
37	4	342	5	33.6
36	6	348	4	32.7
35	2	350	3	31.7
34	1	351	2	30.7
33	3	354	2	29.7
31	1	355	1	27.7
30	2	357	1	26.7
29	1	358	0	25.7
28	1	359	0	24.7

or above a given score is shown under the heading "Cumulative Frequency." The fourth column from the left contains the Percentile Rank which can be used to interpret the test scores in terms of where one student stands in comparison to the total standardization population. The percentile rank corresponding to a specific raw score is the percentage of students receiving lower scores plus half of the students receiving that particular score. For example, the student receiving a score of 72 on Table 8 achieved a higher score than 96 percent of the total standardization population.

The final column on the right in Table 8 lists the standard score corresponding to each raw score. The standard score, for persons interested in more involved statistical information, is a linear transformation of the raw score distribution so that the mean score is 50 and the standard deviation is 10 (often known as a T score).[1]

The standard deviation of the raw score was 10.11 and is an indicator of the degree to which the scores are spread about the mean. The variance of the raw scores (the square of the standard deviation) was 102.16. Stanines for the clothing construction test were established using a standardization population of 359 students with a mean of 53.64 and a standard deviation of 10.11 (see Table 9).

Ahmann and Glock, op. cit., p. 274.

TABLE 9.--Stanines for the clothing construction test for a standardization population of 359 students with a mean of 53.64 and a standard deviation of 10.11

Stanine	Raw Score Range	Percentage at Each Level	Range of Percentile Ranks
9	72 and above	4	97 and above
8	68-71	7	91-96
7	62-67	12	78-90
6	57-61	17	64-77
5	52-56	20	44-63
4	47-51	17	27-43
3	42-46	12	12-26
2	37-41	7	5-11
1	36 and below	4	4 and below

Item Analysis

A number of item statistics are reported in Appendix H (p. 79) which will aid in the evaluation of the test items. The index of difficulty and the index of discrimination is given for each item. Table 10 summarizes the distribution of item difficulty indices and Table 11 summarizes the distribution of the discrimination indices of the clothing construction test. The item difficulty mean was 46 and the item discrimination mean was 25.

TABLE 10.--Summary data on the distribution of item difficulty indices of the clothing construction test

Item Difficulty Index[a]	Number of Test Items
81 - 100	4
61 - 80	18
41 - 60	40
21 - 40	27
00 - 20	11

[a]Percentage of the total population tested who answered the items incorrectly, indicating whether the items were too difficult (by a high index) or too easy (by a low index).

TABLE 11.--Summary data on the distribution of item discrimination indices of the clothing construction test

Discrimination Power Index[a]	Number of Test Items
81 - 100	0
61 - 80	0
41 - 60	17
21 - 40	43
00 - 20	35
Less than 00	5

[a]Difference between the percentage of high achieving students (upper 27 percent of testing population) who got the item right and the percentage of low achieving students (lower 27 percent of testing population) who got the item right. A high index indicates that the test item was answered correctly by more high achieving students than low achieving students. If the index is less than zero, more low achieving students answered the item correctly.

The point biserial correlation, commonly used as an indicator of item discrimination, is listed for each item in Appendix H. The correlation assumes that the test score distribution is normal and that the division of item performance is a natural dichotomy. The point biserial correlation is a correlation between student performance on an item (right or wrong) and his test score. The possible range of values is from +1 to -1; a correlation of .40 is considered adequate, while .50 is exceptionally high.[2] The mean point biserial correlation of this clothing construction test was .22.

The test reliability, estimated by the Kuder-Richardson Formula #20, was .80. The standard error of measurement was 4.54. The size of the standard error of measurement depends on the standard deviation of the test scores and on the estimated reliability of the test; it is a common device for interpreting the reliability of a test.

---

[2]Georgia Sachs Adams, Measurement and Evaluation in Education, Psychology, and Guidance (New York: Holt, Rinehart and Winston, 1964), p. 355.

CHAPTER IV

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Few devices for high school clothing construction evaluation have been made available for commercial use and, to date, no data has been published on the reliability of these published evaluation devices. Recognizing the fact that the evaluation of achievement is the final and necessary step of any educational process, the main objective of this study was to develop a standardized paper-and-pencil test which would satisfactorily measure the achievement level in clothing construction of senior high school students who were completing a two semester clothing course. The reliability of the test was established to determine the extent to which the instrument was consistent in measuring student knowledge in the area of clothing construction.

High school curriculum guides and popular high school clothing textbooks were evaluated and were used as a guide when constructing the instrument. Clothing construction curriculum objectives were formulated and a table of specifications was developed to illustrate the percentage of textbook coverage allowed various objectives and subject content areas. An outline of test content was also prepared to help insure adequate coverage of the content areas and to aid in determining if the test meets the individual needs of a teacher.

College pretests were viewed in light of the established criterion; objective items which met the content and course objectives

requirements were incorporated into the instrument being developed. Twenty five true-false items formed the General Information part of the achievement test (Part I) and 75 multiple-choice items included Knowledge of Specific Facts and Common Terms (Part II), and Understanding of Principles and Generalizations (Part III). The multiple-choice items were of the four option variety. A total time limit of 50 minutes was established and a Manual of Directions and student directions were developed.

The instrument was administered to 359 high school clothing students from 11 school districts in Michigan and Illinois. The tests were scored and an item and test analysis were made to determine the reliability of the instrument.

Conclusions

The adaptation of test items from college pretests proved to be satisfactory. All major content areas and objectives (which are included in curriculum guides for Michigan and Illinois and are included in popular textbook and reference books in the area of clothing construction) were covered in the developed high school achievement test and an item analysis proved the effectiveness of the test items. Forty of the 100 test items were within the 41-60 range of discrimination with an item difficulty mean of 46. The ideal item is one with a difficulty rating of 50. Nunnally[1] states that few items should be included in a test with an item difficulty index above 80 or below 20. The developed clothing construction test had only four items with an item difficulty index above 80 and 10 items below 20. It can be concluded that the general item difficulty level was

---

[1]Jum C. Nunnally, Educational Measurement and Evaluation (New York: McGraw-Hill, 1964), p. 82.

satisfactory for the high school students being tested.

The discrimination power of the test was low with a mean of 25. Test items should have a discrimination index of at least 20 points; 40 of the items on the test developed had an index of less than 20, including five items with an index of less than zero. A review of the test items receiving a low discrimination index indicates that 18 of the 25 true-false items had low indices of discrimination. Students not knowing the correct answer or reading the true-false statement hastily could easily guess at the correct answer, and the "guessing" failed to discriminate between high and low achieving students.

In the multiple-choice variety, the chance of guessing was reduced. A lack of item clarity was the probable cause of the low item discrimination indices of 17 of the items. Either the wording was ambiguous or the student was not familiar with the item content and could not intelligently select the correct option.

The raw score distribution of the developed 100 item clothing construction test ranged from 84 to 28 with a mean of 53.64 and a standard deviation of 10.11. A normal bell-shaped curve was approximated with 68 percent of the total testing population receiving raw scores of 63.75 to 43.53.

The low raw score distribution is not surprising. The content covered in the test was included in popular clothing textbooks, but all clothing students do not come in contact with all of the content areas in a single two-semester course. Furthermore, research should be done to correlate the scores received on this test with scores received on a test in another subject area. The experience of the researcher indicates that many low achievers enroll in clothing courses and the low mean score of

this test is merely indicative of the general achievement level of the standardization population.

The point biserial correlation mean is a correlation between the student performance on an item (right or wrong) and the test score. It assumes that the test score distribution is normal and that the division on item performance is a natural dichotomy. The possible range of values is from +1 to -1 with .40 considered adequate and .50 considered exceptionally high. The correlation of .22 designates a positive degree of correlation.

No arbitrary standard can be established regarding satisfactory levels for reliability coefficients. A high reliability coefficient (.94) must be set when a teacher is required to make major decisions about individual students on the basis of a single test but such situations are rare. A minimum reliability of .50 is considered satisfactory if the test score is used to evaluate the level of group accomplishment. The Kuder-Richardson Formula #20 estimated the reliability of this clothing construction test as .80 which is within the accepted normal range.

This standardized test is designed to measure achievement in clothing construction of students in grades nine through twelve who are completing a two semester clothing course. It was developed to measure scholastic aptitude and achievement only to the extent that the objectives of the teacher, curriculum and textbooks correspond to those outlined on pages 15 to 21. Neither the test nor the norms can be considered valid if the objectives, curriculum guides or textbooks used by the teacher differ markedly from those outlined. The standard directions in the Manual of Directions which accompany this standardized clothing

construction test insure the valid use of the established norms.

The use of the test results may be many and varied, but the immediate purpose, upon which all ultimate uses depend, is to provide an objective and reliable measure of the educational achievement of the pupils tested.

Each teacher must decide how this test can be most helpful in her own situation, but the following uses will illustrate the ways in which it might be found helpful in adapting education to the individual:

1. To furnish information about the capabilities and achievements of each students, thus making possible the identification of those individuals who merit special provisions because of distinct handicaps or markedly superior performance.
2. To indicate the pattern of achievement for each student, so that information about his areas of relative strength and weakness may serve as a sounder basis for educational and vocational guidance than school marks, which are not only unreliable but are not comparable from class to class.
3. To provide a more realistic method than a mere counting of numbers of semesters of study for determining when a student has attained competence in the area of clothing construction.
4. To serve both as a partial basis for appraising the relative effectiveness of curriculum materials and methods of instruction in the area of clothing construction and as a general incentive toward improved teaching and learning.

It should be emphasized once more that this test score will provide only one type of information about the needs, achievement, and interests of the students, and that sound educational guidance requires that as

much relevant information as possible (progress reports, observation in the laboratory situation, final projects, check list evaluations of constructed projects, etc.) be collected from all available sources. Test results form a valuable part of the informational background needed for guidance, but they are only a part, and should be interpreted in conjunction with information of many other types.

Recommendations

In view of the steps which have been taken in constructing the standardized clothing construction test, the following recommendations can be made:

1. Further studies should be conducted to improve the clothing construction achievement test. Items with low discrimination should be replaced with new items, with necessary care taken to avoid eliminating important subject content areas.
2. Studies should be conducted to determine a broader use of the evaluation instrument. The present low ranking of the raw scores and satisfactory distribution of item difficulty indices indicates a possible use for advanced high school clothing students.
3. Experimentation could be done at the college level to determine the effectiveness of the clothing construction test as a criteria for allowing exceptional students to by-pass the beginning clothing construction course.
4. An evaluation device should be developed which would measure the practical or proficient knowledge in clothing construction which would help to provide an even clearer picture of student ability.

APPENDIX A

April 17, 1967

Chairman
Department of Home Economics
The University of Iowa
Iowa City, Iowa 52240

Dear Madam:

As a graduate student in the Clothing and Textiles Department at Michigan State University, East Lansing, Michigan, I am about to develop a standardized clothing test which can be used to test the knowledge of clothing construction skills. The test will be limited to a paper-and-pencil test which will satisfactorily measure the achievement level in clothing construction of senior high school students who are completing a two-semester clothing course. Stanine scores will be established so that student achievement levels can be evaluated.

In order that the achievement test have adequate and representative coverage, I have been evaluating a collection of clothing texts which have been preferred by home economics teachers when teaching clothing construction. The breadth and depth of clothing construction terminology and techniques were investigated and will be used as a guide when developing the test.

As a further guide, I am now asking college clothing and textiles departments if they have clothing construction pretests available which I could examine and compare. Information which is generally considered important, information generally omitted, and common phraseology will be noted and will be used as a helpful guide when developing the high school achievement test.

If you have used or are now using a college pretest in the area of clothing construction, I would appreciate your sending me an examination copy. The test will not be duplicated or distributed to anyone but will be used

as a guide for determining the extent of coverage and the forming of a generally acceptable clothing construction achievement test.

Thanking you in advance for your time and your interest in this research project, I remain,

Sincerely,

Sister Charles Miriam, O.P.
Mount St. Mary Academy
701 Geneva Road
St. Charles, Illinois 60174

P.S. I will be happy to send you an examination copy of the finalized achievement test (and established Stanine scores) upon request.

APPENDIX B

USE OF CLOTHING CONSTRUCTION PRETESTS IN SELECTED COLLEGES

College	Pretest Not Used	Pretest Used	
		Objective	Practical
Auburn University Auburn, Alabama	X		
Pepperdine College Los Angeles, California	X		
Colorado State University Fort Collins, Colorado	X		
Colorado State College Greeley, Colorado		X	
Eastern Illinois University Charleston, Illinois		X	
Illinois Teachers College Chicago, Illinois	X		
Northern Illinois University DeKalb, Illinois		X	X
Northwestern University Evanston, Illinois	X		
Bradley University Peoria, Illinois		X	
Rosary College River Forest, Illinois	X		
St. Dominic College St. Charles, Illinois	X		
University of Illinois Urbana, Illinois	X		
Olivet Nazarene College Kankakee, Illinois	X		

USE OF CLOTHING CONSTRUCTION PRETESTS IN SELECTED COLLEGES--Continued

College	Pretest Not Used	Pretest Used	
		Objective	Practical
University of Iowa Iowa City, Iowa	X		
Kansas State Teachers College Emporia, Kansas	X		
Kansas State University Manhattan, Kansas		X	
Morehead State University Morehead, Kentucky	X		
Louisiana State University Batan Rouge, Louisiana		X	
Simmons College Boston, Massachusetts	X		
Wayne State University Detroit, Michigan		X	
Western Michigan University Kalamazoo, Michigan	X		
Michigan State University East Lansing, Michigan	X		
University of Montana Missoula, Montana	X		
Cornell University Ithaca, New York		X	
New York University New York, New York	X		
Ohio University Athens, Ohio		X	
Ohio State University Columbus, Ohio		X	
Oklahoma State University Stillwater, Oklahoma		X	X

USE OF CLOTHING CONSTRUCTION PRETESTS IN SELECTED COLLEGES--Continued

College	Pretest Not Used	Pretest Used	
		Objective	Practical
Oregon State University Corvallis, Oregon		X	X
University of Rhode Island Kingston, Rhode Island		X	
University of Tennessee Knoxville, Tennessee		X	
Texas Woman's University		X	X
Utah State University Logan, Utah	X		
University of Utah Salt Lake City, Utah		X	X
Longwood College Farmville, Virginia	X		
Washington State University Pullman, Washington	X		
University of Washington Seattle, Washington	X		
Marshall University Huntington, West Virginia	X		

APPENDIX C

February 7, 1967

Burgess Publishing Company
424 South Sixth Street
Minneapolis, Minnesota 55415

Gentlemen:

As a graduate student in the Clothing and Textile Department at Michigan State University, East Lansing, Michigan, I am about to develop a standardized clothing test which will be used to test the knowledge of clothing construction skills. The test will be limited to a paper-and-pencil test which will satisfactorily measure the achievement level in clothing construction of senior high school students who are completing a two-semester clothing course. Stanine scores will be established so that student achievement levels can be evaluated.

In order that the achievement test have adequate and representative coverage, may I ask you for the following information:

1. Which of the following texts seems to be preferred for use in clothing construction units at the high school level?

   A. Let's Alter Your Pattern
      Sonneland, Yvonne, E. (1963)

   B. Flat Pattern Methods
      Hollen, Norma R. (1965)

   C. It's So, Sew Easy
      Bancroft, Vivian (1962)

   D. Another clothing construction reference published by Burgess

2. How many of these texts were ordered from you during 1966-1967 for use in high schools? (Numerical statistics will most clearly show extent of use at the high school level.)

Finally, will you please send me an examination copy of your book which appears to be the most widely used text or reference in the high schools today? Using this book and other most generally accepted references as the basis for the material to be tested, I should be able to develop a test which would cover representative information.

Thanking you in advance for your time and your interest in this research project, I remain,

Sincerely,

Sister Charles Miriam, O.P.
Mount St. Mary Academy
701 Geneva Road
St. Charles, Illinois 60174

P.S. I will be happy to send you an examination copy of the finalized achievement test (and established Stanine scores) upon request.

APPENDIX D

April 23, 1968

Home Economics Department Head
Wayne Memorial High School
3001 Fourth Street
Wayne, Michigan 48184

Dear Home Economics Teacher:

In partial fulfillment of the requirements for my Master's Degree at Michigan State University, I have developed a written achievement test in clothing construction for high school students. Popular texts and reference books were used in the development of the test and an attempt was made to include a wide variety of learnings, including general information, a knowledge of specific facts and common terms, and the understanding and application of principles and generalizations.

I am now interested in administering the test to a large number of students in a wide variety of school systems. A definite attempt is also being made to test a variety of rural, suburban, and urban populations in correct statistical proportions. In all, about 300 students will be tested and the results will be used as a basis for judging the strengths and/or weaknesses of the achievement test being evaluated.

May I ask for your cooperation in this study? Please fill in the information asked for on the enclosed form and return it to me immediately. An addressed envelope has been provided for your convenience.

Sincerely,

Sister Charles Miriam, O.P.
Mount St. Mary Academy
701 Geneva Road
St. Charles, Illinois 60174

School _____

Clothing Instructor _____

1. The achievement test is for high school students who are completing a two-semester course in clothing. (Preferably two consecutive semesters in clothing, NOT students in a general home economics course.) It is extremely important that students of various levels of intellectual ability be evaluated so that test results be valid.

   How many students do you now teach who are completing their second semester in a Clothing course?

   _____
   Number of Students

2. Would you be able to schedule a 50 minute testing period before May 15, 1968?

   ☐ Yes

   ☐ No

Mimeographed tests, directions, and answer sheets will be sent to schools who are able to cooperate in this testing program. The tests and directions need not be returned but the answer sheets should be returned to me immediately.

Sister Charles Miriam, O.P.
Mount St. Mary Academy
701 Geneva Road
St. Charles, Illinois 60174

APPENDIX E

SCHOOLS FROM WHICH THE STANDARDIZATION POPULATION WAS SELECTED

School	Population of City[a]	Number of Pupils			
		Number Tested	None Qualify	Not Used	No Response
SS. Peter and Paul School Ruth, Michigan	304				X
Stephenson High School Stephenson, Michigan	820		X		
Yorkville High School Yorkville, Illinois	1,568	26			
Newberry High School Newberry, Michigan	2,612		X		
Plano High School Plano, Illinois	3,343				X
Mather High School Munising, Michigan	4,228	37			
West Chicago High School West Chicago, Illinois	6,854	42			
Batavia High School Batavia, Illinois	7,496		X		
Geneva High School Geneva, Illinois	7,646			X	
Mount St. Mary Academy St. Charles, Illinois	9,269			X	
St. Charles High School St. Charles, Illinois	9,269		X		
Iron Mountain High School Iron Mountain, Michigan	9,299	39			

[a]1960 census figures.

SCHOOLS FROM WHICH THE STANDARDIZATION POPULATION WAS SELECTED--Continued

School	Population of City[a]	Number of Pupils			
		Number Tested	None Qualify	Not Used	No Response
St. Paul High School Grosse Pointe Farms, Michigan	12,172			X	
Naperville High School Naperville, Illinois	12,933	41			
Wayne Memorial High School Wayne, Michigan	16,034	35			
West Aurora High School Aurora, Illinois	63,715			X	
East Aurora High School Aurora, Illinois	63,715	39			
St. Alphonsus High School Dearborn, Michigan	112,007	29			
Monsignor Gabriels High School Lansing, Michigan	118,000	12			
Muldoon High School Rockford, Illinois	135,000	21			
Calumet High School Chicago, Illinois	3,550,404			X	
DuSable High School Chicago, Illinois	3,550,404			X	
Aquinas High School Chicago, Illinois	3,550,404	38			
Crane High School Chicago, Illinois	3,550,404			X	
Bowen High School Chicago, Illinois	3,550,404				X
Total Standardization Population		359[b]			

[a]1960 census figures.

[b]Michigan total--152; Illinois total--207.

APPENDIX F

CLOTHING CONSTRUCTION TEST

for Grades 9-12

Please print:

Name _____ Date _____
Last First Middle

Grade or Class _____ Age _____ Date of Birth _____

School _____ City _____

Teacher _____ State _____

GENERAL DIRECTIONS: Do not turn page until the examiner tells you to do so. This examination consists of three parts and requires 50 minutes of working time. The directions for each part are printed at the beginning of the part. Read them carefully and proceed at once to answer the questions. DO NOT SPEND TOO MUCH TIME ON ANY ONE ITEM. ANSWER THE EASIER QUESTIONS FIRST: then return to the harder ones if you have time. There is a time limit for each part. You are not expected to answer all the questions in any part in the time limit. If you have not finished a part when the time is up, stop work on that part and proceed at once to the next part. If you finish a part before the time is up, you may go back and work on any part. No questions may be asked after the examination has begun. You may answer questions even when you are not perfectly sure that your answers are correct, but you should avoid wild guessing.

PART	MINUTES	RAW SCORE (Number Right)
I. General Information	10	
II. Knowledge of Specific Facts and Common Terms	15	
III. Understanding and Application of Principles and Generalizations	25	
TOTAL	50	
STANINE SCORE --		

PART I

GENERAL INFORMATION

(10 Minutes)

DIRECTIONS: Mark each true statement with a plus (+) and each false statement with a zero (0) in the blank provided.

1. Fabric is grain perfect when the lengthwise yarns and the crosswise yarns are at right angles to each other. 1. ____

2. At the completion of machine stitching the thread take-up lever should be raised to the highest point possible. 2. ____

3. Half-size patterns are made to fit the slightly developed, short figure with especially small waist and hip proportions. 3. ____

4. When buying a pattern for a straight skirt, select pattern size by the hip measurement if the hips are much larger in proportion to the waist. 4. ____

5. Only three pattern pieces are required for a six gore skirt. 5. ____

6. The grainlines marked on the pattern should be extended from one edge of the pattern to the other. 6. ____

7. To shorten a pattern two inches, a one inch tuck should be made on the alteration line. 7. ____

8. When laying out pattern pieces on broadcloth, the bottom ends of the pattern pieces must all be laid toward the same cut end of the fabric. 8. ____

9. All wool fabrics must be pre-shrunk by the consumer before laying out the pattern. 9. ____

*Test pagination is preserved in brackets in the upper right-hand corner of each page of the test.

10. If a fabric is not cut on the grain, the garment being constructed still can be fitted on the grain. 10. ____

11. To insure a good fit, garments should always be fitted wrong side out. 11. ____

12. Most plaids and large prints require more fabric and more care in pattern placement and cutting. 12. ____

13. A longer sewing machine stitch is required for bulky fabric than for light weight fabrics. 13. ____

14. In direction, skirt seams should be stitched from the top of the skirt down. 14. ____

15. The waistline seams, armhole seams, and facing seams are usually pressed open in the final pressing. 15. ____

16. The size of the buttons used determines the spacing of the buttonholes. 16. ____

17. A shank is always necessary when a buttonhole will lie between the button and the garment. 17. ____

18. Alterations are best made by making small changes in several darts or seams, rather than taking the whole amount in one place. 18. ____

19. The overlap of fabric which covers a zipper is not over one-half inch wide but may be wider at the top to permit space for the pull tab. 19. ____

20. A snap or a button is equally acceptable as a fastener for a skirt waistband. 20. ____

21. All hemming stitches should be loose, invisible, and not too close together. 21. ____

22. French tacks should be used to anchor the bottom of a lining to the coat hem. 22. ____

23. The crosswise grain generally runs parallel to the floor. 23. ____

24. A waistline belt or waist band should always be cut from the crosswise grain of the material. 24. ____

25. The width of a dress hem is determined by the weight of the fabric, the style of the garment, and the size of the wearer. 25. ____

You may go on to the next part.

PART II

KNOWLEDGE OF SPECIFIC FACTS AND COMMON TERMS

(15 Minutes)

DIRECTIONS: Each of the incomplete statements or questions below is followed by several choices. Select the one that BEST completes the statement or answers the question, and put its number in the blank at the right.

26. When constructing a dress, pressing of the bust darts should be done on a: 26. ____
    1. point presser.
    2. regular ironing board.
    3. sleeve board.
    4. tailor's ham.

27. The needleboard is used to: 27. ____
    1. hold open seams.
    2. insure even seam allowances.
    3. press napped or pile fabrics.
    4. mark fabrics after they have been cut.

28. If the machine is skipping stitches, it is generally due to: 28. ____
    1. stitching too rapidly.
    2. presser foot not securely in place.
    3. needle placed incorrectly in needle bar.
    4. loose upper tension.

29. The two tensions of a sewing machine: 29. ____
    1. control the flow of thread from the needle.
    2. control the rate at which the fabric is fed through the feed dog.
    3. control the flow of thread from both the bobbin and needle.
    4. control the length of machine stitch.

30. Junior patterns differ in size from misses patterns in that junior patterns are: 30. ____
    1. shorter waisted.
    2. longer waisted.
    3. fuller through the waist.
    4. for a more developed figure.

31. When taking body measurements to determine the size and type (misses, junior, etc.) of pattern to buy, the hip measurement should be taken: 31. ____
    1. on a horizontal level--not too snug.
    2. seven inches below the waistline.
    3. over a smooth fitting foundation garment.
    4. all of these.

32. What determines the size of the suit pattern you purchase? 32. ____
    1. Hip measurement
    2. Bust measurement
    3. Dress size
    4. Current styles

33. Which of the following fabrics has a nap? 33. ____
    1. Oxford cloth
    2. Rayon faille
    3. Dacron crepe
    4. Cotton suede

34. The yarns which are parallel to the selvage of the fabric are the: 34. ____
    1. filling yarns.
    2. warp yarns.
    3. weft yarns.
    4. woof yarns.

35. If a piece of a fabric has been cut from the bolt when purchased, one should <u>first</u>: 35. ____
    1. pull a crosswise thread and cut on the line it makes.
    2. pull a lengthwise thread and cut on the line it makes.
    3. leave the fabric as it came from the bolt and begin placing the pattern pieces.
    4. pull the fabric on the diagonal to straighten the ends.

36. Sanforizing guarantees against: 36. ____
    1. shrinkage of more than 1%.
    2. sun and heat damage.
    3. running of colors.
    4. shrinkage of more than 3%.

37. Which of the following fabrics requires that all of the pattern pieces be laid in the same direction? 37. ____
    1. Satin
    2. Napped
    3. Striped
    4. Plaids

38. The main purpose of staystitching is to: 38. ____
    1. serve as a guide for permanent stitching.
    2. stiffen seam line of light weight fabrics.
    3. keep a curved (or bias) edge from stretching.

39. Staystitching is done with: 39. ____
    1. one-half inch seam allowances.
    2. a regular machine stitch.
    3. matching thread.
    4. all of these.

40. A method of marking which does not wash out of the 40. ____
    1. dressmaker's carbon and tracing wheel.
    2. tailor's chalk.
    3. tailor's tacks.
    4. pin marking.

41. A skirt back lining is placed in a wool skirt to: 41. ____
    1. add body to the skirt fabric.
    2. lessen the strain on the garment fabric.
    3. shape the wool skirt to the waist and hip curves.
    4. help hemline to fall evenly.

42. Machine basting is normally done with: 42. ____
    1. 6-8 stitches per inch.
    2. 10-12 stitches per inch.
    3. with the upper tension slightly tighter.
    4. with back-tacking at the beginning and ending of the seam line.

43. Pins holding a seam for hand basting should be placed: 43. ____
    1. parallel to the seam edge.
    2. at right angles to the seam edge.
    3. at a diagonal.
    4. in the direction of the stitching line.

44. An example of an enclosed seam in a garment is a: 44. ____
    1. sleeve seam.
    2. waistline seam.
    3. collar or facing seam.
    4. side seam of skirt.

45. A true bias strip is cut: 45. ____
    1. parallel to the selvage.
    2. at a 90 degree angle to the selvage.
    3. off grain.
    4. at a 45 degree angle to the grainline.

46. The first step in stitching a French seam is to: 46. ____
    1. place the wrong sides of the fabric together.
    2. place the right sides of the fabric together.
    3. press edge under on seamline, and place on matching seamline.
    4. grade edges of both seams and stitch on the seamline.

47. Understitching is a means of: 47. ____
1. finishing the hem of a dress.
2. finishing a curved seam to make it flat.
3. adding horsehair braid to give body to a construction.
4. finishing the raw edge of facings.

48. Grading a seam means to: 48. ____
1. trim the seam allowance to 1/8 inch.
2. finish seams to improve their appearance.
3. trim the various pieces of seam allowance to differing widths.
4. clip seam allowance on all curved seams.

49. The shoulder seamline in a blouse generally: 49. ____
1. is longer in the back than in the front.
2. is shorter in the back than in the front.
3. has darting or easing in the front.
4. is trimmed off when the front and back are not the same length.

50. What direction do you press vertical darts on a dress bodice? 50. ____
1. Toward the waistline
2. Toward the center front and center back
3. Toward the neckline
4. Away from the center front and center back

51. Bound or piped buttonholes are generally made on a: 51. ____
1. man's sport jacket.
2. tailored dress.
3. child's coat.
4. skirt waistband.

52. What determines the length of the buttonhole in a blouse? 52. ____
1. The type of button used
2. The number of buttonholes needed
3. The diameter of the button
4. The diameter plus the thickness of the button

53. The type of zipper suggested for an underarm opening in a dress with sleeves is a(n): 53. ____
1. open at one end 9 inch zipper.
2. nylon coil 10 inch zipper.
3. closed end 12 inch zipper.
4. open at one end 22 inch zipper.

54. The cloth fold on a lapped zipper should lap over to: 54. ____
1. meet the edge of the zipper chain.
2. meet the edge of the underlap.
3. meet the stitching on the underlap.
4. cover the stitching on the underlap.

55. Sleeves which are cut in one with the bodice are called: 55. ____
    1. raglan sleeves.
    2. set-in sleeves.
    3. kimono sleeves.
    4. cap sleeves.

You may go on to the next part.

PART III

UNDERSTANDING AND APPLICATION OF PRINCIPLES AND GENERALIZATIONS

(25 Minutes)

DIRECTIONS: Continue as in the preceding part.

56. To insure a perfect stitch with good tension, test the fabric by stitching a short distance on: 56. ____
    1. a double thickness of fabric on crosswise grain.
    2. a double thickness of fabric on lengthwise grain.
    3. a double thickness of fabric on the bias.
    4. a single thickness of fabric on the lengthwise grain.

57. If 2 inches need to be added to the waistline circumference of a dress bodice, the amount which would need to be added to the bodice front of the pattern piece is: 57. ____
    1. 1/2 inch.
    2. 1 inch.
    3. 2 inches.
    4. 2 inches plus some extra for ease.

58. To shorten a blouse pattern 1 inch, which method is correct? 58. ____
    1. Take a horizontal tuck of 1 inch
    2. Take a horizontal tuck of 1/2 inch
    3. Cut 1 inch off the bottom of the pattern
    4. Take a vertical tuck of 1/2 inch

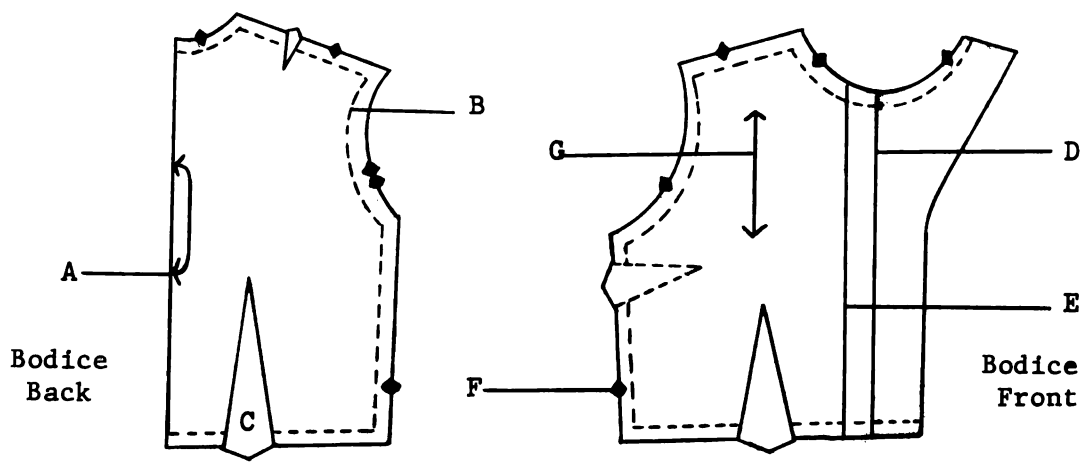
[8]

59. If the bodice of a one-piece dress is too short, the pattern should be lengthened by: 59. ____
    1. adding the needed amount at the waistline edge.
    2. tucking the pattern the needed amount.
    3. slashing the pattern about midway between the underarm and waistline and adding the needed amount.
    4. slashing the pattern about midway between the underarm and waistline and adding 1/2 the needed amount.

60. If the pattern of a fitted skirt is too tight at the hipline, you should add width: 60. ____
    1. at center front and center back and keep the waistline the same width.
    2. to the center of the pattern and increase the width of the waistline darts.
    3. to the hipline by increasing the number of darts at the waist.
    4. to the hipline by decreasing the waistline darts and adding extra fabric to the side seams.

61. The fabric that requires the lowest ironing temperature is: 61. ____
    1. wool tweed.
    2. cotton dimity.
    3. acetate lining.
    4. Irish linen.

Items 62-68: Refer to the drawings of a bodice front and a bodice back pattern below.



62. On the blouse pattern shown above, the edge A designates: 62. ____
    1. straight of the fabric.
    2. place on fold of fabric.
    3. center back of bodice.
    4. all of the above.

63. On the blouse pattern shown on page 8, marking B is for: 63. ____
1. alteration line.
2. ease.
3. seamline.
4. cutting line.

64. On the blouse pattern shown on page 8, marking C is for: 64. ____
1. alteration area.
2. matching seams.
3. shaping garment.
4. area to be eased.

65. On the blouse pattern shown on page 8, marking D is for: 65. ____
1. center front.
2. alteration line.
3. stitching line.
4. fold line.

66. On the blouse pattern shown on page 8, marking E is for: 66. ____
1. buttonholes.
2. fold line.
3. alteration line.
4. center front.

67. On the blouse pattern shown on page 8, marking F is for: 67. ____
1. a cutting guide.
2. altering seam allowances.
3. ease in fitting garment.
4. matching pattern sections.

68. On the blouse pattern shown on page 8, marking G is for: 68. ____
1. altering garment.
2. placing on selvage.
3. placing on fold of fabric.
4. insuring grain perfection.

69. Cotton fabric as sold on the bolt is usually: 69. ____
1. 30 inches wide.
2. 36 inches wide.
3. 45 inches wide.
4. 54 inches wide.

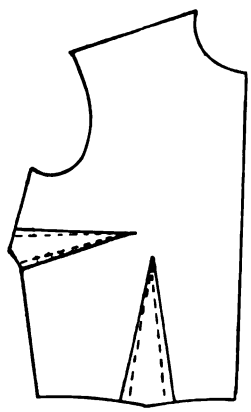
70. During the pinning process, pattern pieces should: 70. ____
1. be placed, one at a time, on the fabric and pinned.
2. all be placed on the fabric before final pinning.
3. always face in the same direction.
4. always follow the lengthwise grain.

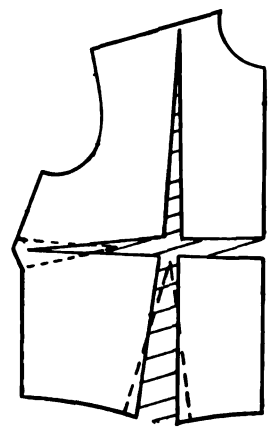
71. Uneven ends of fabric are cut along one continuous thread to determine: 71. ____
    1. crosswise grain of the fabric.
    2. lengthwise grain of the fabric.
    3. correct pattern layout.
    4. if enough fabric has been purchased.

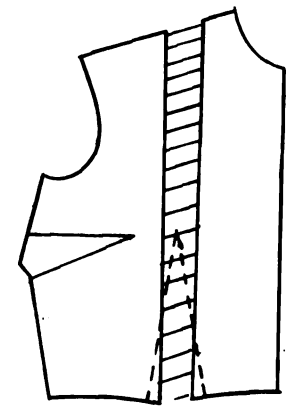
Items 72-76 : Pattern Alteration

From the alterations given below, select the most appropriate method of alteration. (Slanted lines indicate slashing and spreading within pattern piece while broken lines indicate darts have been re-drawn.)

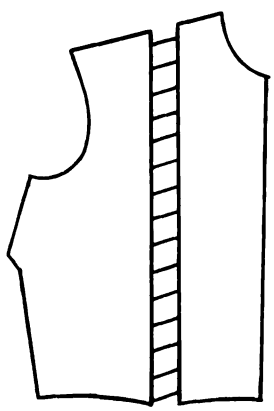
72. Bodice too tight across bustline: 72. ____

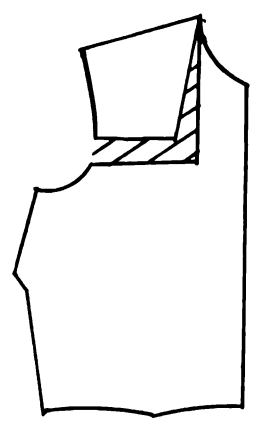
1. 

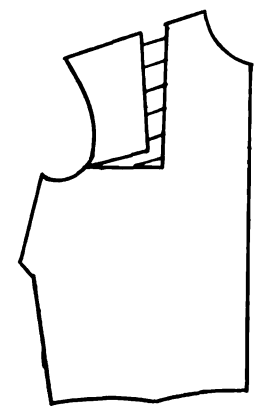
2. 

3. 

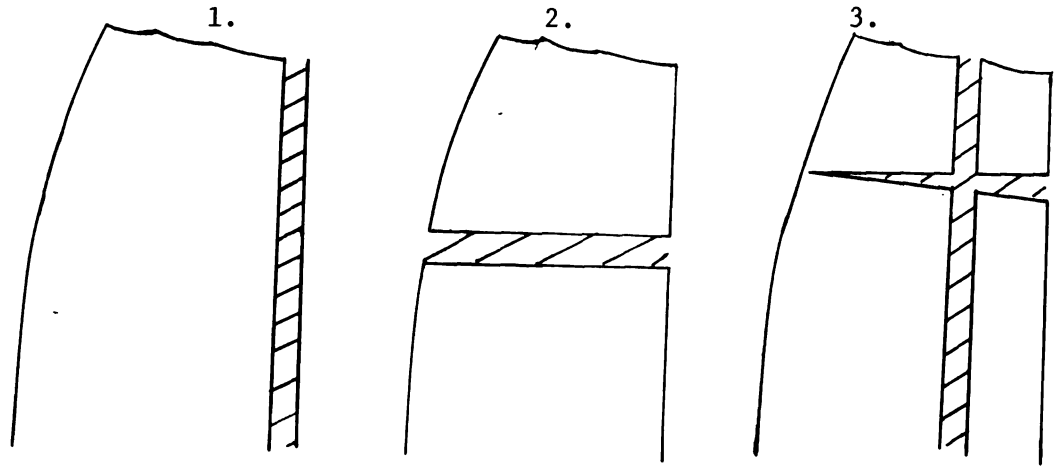
73. Shoulders of the pattern are too narrow: 73. ____

1. 

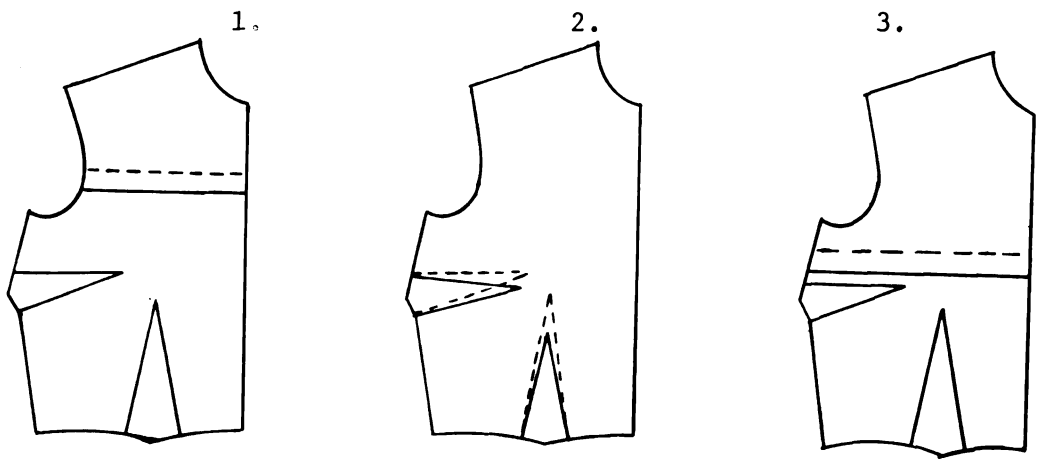
2. 

3. 

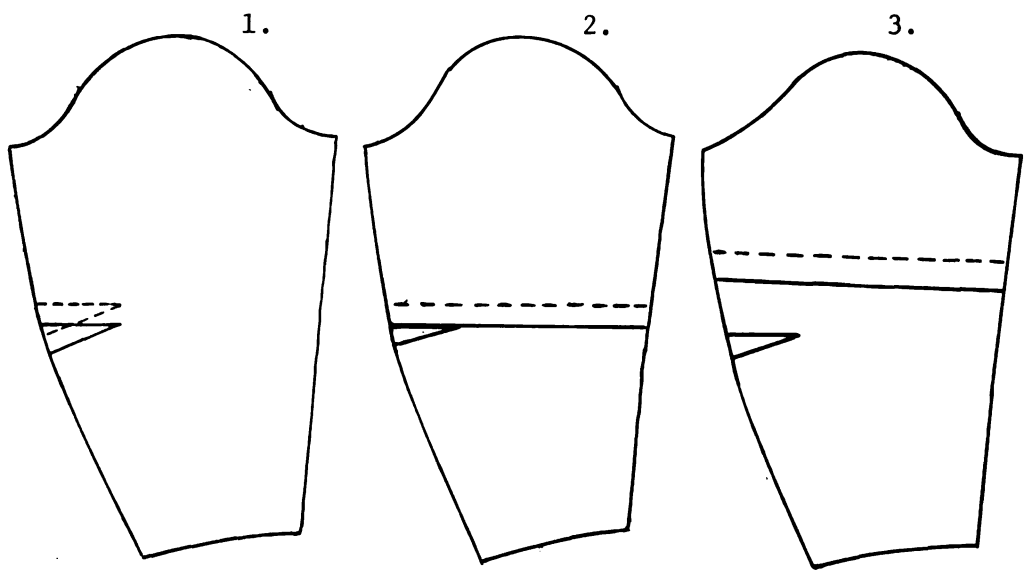
74. Skirt too tight across abdomen: 74. ____



75. Bustline of the pattern too low: 75. ____



76. Sleeve too long above elbow: 76. ____



77. When placing pattern pieces on the fabric in preparation for cutting, one should first: 77. ____
1. pin pattern grain line marking on straight of fabric.
2. measure grain line and pin corners of pattern to fabric.
3. pin center front and center back on fabric grain line.
4. pin all small pattern pieces in one area of fabric.

78. A method of marking which is suitable for a very thick, spongy fabric is: 78. ____
1. dressmaker's carbon and tracing wheel.
2. tailor's chalk.
3. tailor's tacks.
4. straight pins.

79. Select the fabric which decreases the apparent size of a heavy person. 79. ____
1. Fabric with large, swirling designs
2. Stiff fabric
3. Soft, clinging fabric
4. Dull, textured fabric

80. When making a garment, the recommended procedure is to press the seams: 80. ____
1. after basting and before stitching.
2. before crossing with other seams.
3. after the garment is finished.
4. after stitching main seams.

81. In unit construction the collar is attached to the bodice: 81. ____
1. before the shoulder seams are stitched.
2. after the shoulder seams are stitched, but before the underarm seams are completed.
3. after the shoulder and underarm seams are sewn.
4. after the neck facing is attached.

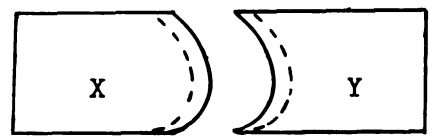
82. The interfacing used in the collar and front facings should be: 82. ____
1. heavier than the fabric and crisp to give stiffness to the area.
2. heavier than the fabric to give firmness to the area.
3. the same or lighter weight than the fabric to give body to the area.
4. very light weight to minimize bulk in the area.

83. The fabric suggested for the lining of a wool flannel skirt is: 83. ____
1. fine cotton voile.
2. dacron crepe.
3. acetate sheath lining.
4. heavy taffeta.

84. A good fabric for interfacing in a convertible collar for a cotton gingham blouse would be: 84. ____
1. Pellon.
2. cotton batiste.
3. rayon taffeta.
4. unbleached muslin.

85. Best results are usually obtained if the interfacing is cut on the: 85. ____
1. bias.
2. crosswise grain.
3. lengthwise grain.
4. same grain as the area to be interfaced.

86. 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 on pattern Y? 86. ____
1. Clip
2. Grade
3. Notch
4. Stretch



87. The primary function of darts placed in the back of a skirt is: 87. ____
1. to allow for waistline alterations.
2. to shape the fabric to fit body.
3. to carry through design from bodice.
4. to create hipline ease.

88. Which of the following diagrams indicates a machine stitch with an upper tension which is too tight? 88. ____

1. 2. 3.

89. Seams pucker when: 89. ____
1. the wrong size needle is used.
2. the thread is too fine.
3. the tension is too tight.
4. the stitch is too fine.

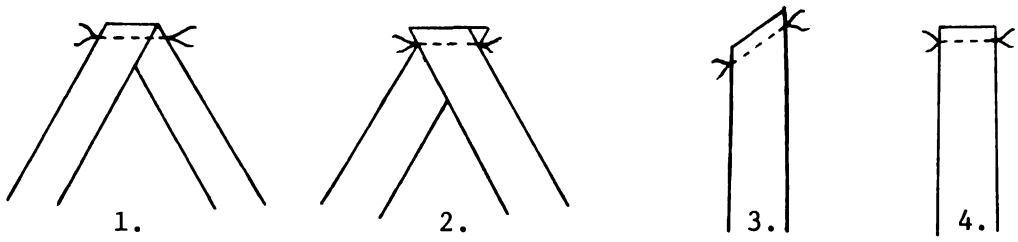
90. What should be done to the curved areas of each garment section to prevent them from stretching while the garment is being constructed? 90. ____
    1. Apply seam tape to the areas which will stretch
    2. Interface with a firm but sheer fabric
    3. Staystitch by machine
    4. Construct that section of the garment first

91. Darts should be stitched: 91. ____
    1. from the narrow end to the wide end.
    2. from the wide end to the narrow end.
    3. with a slightly longer stitch.
    4. before staystitching has been done.

92. Which of the seams should be graded in a woolen suit? 92. ____
    1. Center back seam of the jacket
    2. Dart of the jacket
    3. Side seam of the skirt
    4. Waistline seam of the skirt

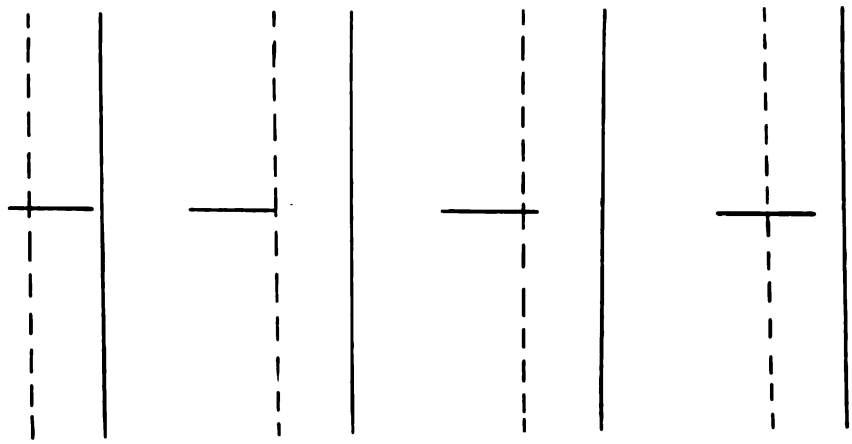
93. What should be done to flatten the seam allowances of the neckline of a cotton dress? 93. ____
    1. Clip
    2. Notch
    3. Stitch 1/8 inch from the raw edge
    4. Press and understitch

94. Which is the best method for joining bias strips? 94. ____



95. When attaching straight seam tape to the top of a skirt hem which is slightly flared, one should: 95. ____
    1. ease the tape and hold the top of the hem taut.
    2. hold the tape taut and ease in fullness at top of hem.
    3. hold the tape and top of hem with equal tension.
    4. make little tucks at the top of the hem as you sew on tape.

96. In the following diagram showing placement of buttonholes in relation to the center front of a blouse, which placement is correct? (Broken line indicates center front of blouse; solid line indicates front edge of blouse.) 96. ____



97. When basting a sleeve into an armhole, have: 97. ____
1. bodice turned wrong side out and the sleeve right side out.
2. both sleeve and bodice turned wrong side out.
3. sleeve turned wrong side out, bodice right side out.
4. both sleeve and bodice turned right side out.

98. When basting or pinning a sleeve into the armhole for the first fitting, one should: 98. ____
1. evenly distribute fullness around armhole seam.
2. ease more fullness toward the back after notches have been matched.
3. match notches and top of sleeve cap with shoulder seam, then distribute fullness evenly.
4. ease more fullness toward the front after notches have been matched.

99. If the center front of a skirt is cut on grain, one would expect the center front line to: 99. ____
1. create a gentle flare.
2. stand out, away from the body.
3. pull toward one of the side seams.
4. hang straight.

100. In checking the fit of a bodice front, the crosswise grain across the fullest part of the bust should: 100. ____
1. rise slightly at center front.
2. dip slightly at center front.
3. remain level.
4. slant downward toward side seams.

If you finish before the time is up you may work on any previous part.

APPENDIX G

May 2, 1968

Home Economics Department Head
Wayne Memorial High School
3001 Fourth Street
Wayne, Michigan 48184

Dear Home Economics Teacher:

The answers to my request that 300 students be given the written achievement test in clothing construction are proving most satisfactory. Enclosed are ___ copies of the test which you have agreed to administer. Students tested should be completing their second semester in a Clothing (not General Home Economics) course.

Standard directions are enclosed. Please use them so that a high degree of uniformity can be insured in the schools participating. Also use the Michigan State University answer sheets. They will be machine scored at the University Testing Service and the results will be used as a basis for judging the strengths and/or weaknesses of the achievement test being evaluated.

RETURN ALL OF THE ANSWER SHEETS IMMEDIATELY in the enclosed envelope. You may keep the tests and standard directions for use in future classes--a small gesture of appreciation for your time and cooperation in this testing project.

Sincerely,

Sister Charles Miriam, O.P.
Mount St. Mary Academy
701 Geneva Road
St. Charles, Illinois 60174

APPENDIX H

BASIC ITEM ANALYSIS STATISTICS OF THE CLOTHING CONSTRUCTION ACHIEVEMENT TEST

Item Number	Correct Response	Index of Difficulty	Index of Discrimination	Point Biserial Correlation
1	1	10	14	.1636
2	1	14	21	.2574
3	2	32	36	.2935
4	1	8	10	.1584
5	2	44	- 2	-.0108
6	2	52	13	.0979
7	1	33	31	.2578
8	2	67	18	.1495
9	2	53	19	.1388
10	2	40	11	.0816
11	2	41	8	.0619
12	1	7	13	.1703
13	1	39	9	.1191
14	2	51	33	.2768
15	2	35	46	.3719
16	1	33	- 6	-.0662
17	1	44	0	-.0020
18	1	9	12	.1499
19	1	63	- 9	-.0462
20	2	79	20	.1635
21	1	30	0	-.0009
22	1	29	7	.0694
23	1	28	10	.1318
24	2	56	25	.2585
25	1	37	6	.0475
26	4	54	22	.2252
27	3	54	31	.2711
28	3	76	10	.1204
29	3	30	42	.3621
30	1	43	22	.2208
31	4	45	28	.1948
32	2	62	17	.1269
33	4	30	48	.4198
34	2	57	22	.1945
35	1	53	48	.3593
36	1	44	37	.2796
37	2	49	36	.3193
38	3	19	46	.4537

BASIC ITEM ANALYSIS STATISTICS OF THE CLOTHING CONSTRUCTION ACHIEVEMENT TEST--Continued

Item Number	Correct Response	Index of Difficulty	Index of Discrimination	Point Biserial Correlation
39	4	32	34	.2805
40	1	21	31	.3170
41	2	57	42	.3196
42	1	20	20	.2509
43	2	55	44	.3145
44	3	54	19	.1562
45	4	51	51	.4144
46	1	69	22	.1840
47	2	42	30	.2679
48	3	59	48	.3816
49	1	63	42	.3458
50	2	38	38	.3280
51	2	53	22	.1458
52	4	62	47	.3891
53	3	55	40	.3069
54	4	43	39	.2875
55	3	67	29	.2322
56	3	84	10	.1105
57	1	86	2	.0398
58	2	63	39	.3089
59	3	58	41	.3179
60	2	88	- 2	.0013
61	3	36	34	.2946
62	4	83	20	.2056
63	3	8	14	.2449
64	3	29	42	.3649
65	4	55	25	.2462
66	4	61	33	.2831
67	4	29	48	.4062
68	4	14	27	.3361
69	2	51	18	.1520
70	2	39	31	.2672
71	1	49	48	.3951
72	2	62	8	.0476
73	3	32	39	.3057
74	3	55	17	.1159
75	2	32	25	.2190
76	3	49	17	.1738
77	1	52	38	.2943
78	3	35	35	.2624
79	4	47	35	.2610
80	2	57	32	.2249
81	2	58	22	.1861
82	3	57	5	.0589

BASIC ITEM ANALYSIS STATISTICS OF THE CLOTHING CONSTRUCTION ACHIEVEMENT TEST--Continued

Item Number	Correct Response	Index of Difficulty	Index of Discrimination	Point Biserial Correlation
83	3	39	14	.1387
84	2	71	- 8	-.0533
85	4	47	32	.2518
86	1	39	19	.1320
87	2	31	28	.2579
88	2	45	33	.2631
89	3	31	23	.1670
90	3	14	32	.3714
91	2	14	27	.3038
92	4	59	57	.4592
93	1	69	8	.0572
94	2	69	30	.2621
95	2	70	16	.1166
96	3	78	16	.1628
97	1	67	20	.1492
98	3	42	33	.2774
99	4	35	59	.4444
100	3	58	28	.2393
	Mean	46	25	.22

BIBLIOGRAPHY

BIBLIOGRAPHY

Books

Adams, Georgis Sachs. Measurement and Evaluation in Education, Psychology, and Guidance. New York Holt, Rinehart and Winston, 1964.

Ahman, J. Stanley, and Glock, Marvin D. Evaluating Pupil Growth. Boston: Allyn and Bacon, Inc., 1958.

Arny, Clara Brown. Evaluation in Home Economics. New York: Appleton-Century-Crofts, Inc., 1953.

Bishop, Edna Bryte, and Arch, Marjorie Stotler. The Bishop Method of Clothing Construction. Philadelphia: J. B. Lippincott Company, 1966.

Davis, Frederick B. Educational Measurements and Their Interpretation. Belmont, California: Wadsworth Publishing Company, Inc., 1964.

Hatcher, Hazel M., and Andrews, Mildred E. The Teaching of Home Economics. Boston: Houghton Mifflin Company, 1963.

Home Economics Education: Homemaking Aspect. Springfield, Illinois: Illinois Curriculum Program, Office of the Superintendent of Public Instruction, 1966.

Kelly, Truman L. Interpretation of Educational Measurements. Tarrytown, New York: Harcourt, Brace, and World, Inc., 1927.

Lewis, Dora S., Bowers, Mabel Goode, and Kellunen, Marietta. Clothing Construction and Wardrobe Planning. New York: The Macmillan Company, 1960.

Lindvall, C. M. Testing and Evaluation: An Introduction. New York: Harcourt, Brace, and World, Inc., 1961.

Nunnally, Jum C. Educational Measurement and Evaluation. New York: McGraw-Hill, 1964.

Resource Materials for Home Economics Teachers to Use as a Guide in Developing Local Programs in Homemaking and Family Life Education. Michigan Department of Education, 1965.

Simplicity Sewing Book. New York: Simplicity Pattern Co., Inc., 1965.

Statistical Abstract of the U. S.: 1964. Prepared under the direction of Edwin D. Goldfield, U. S. Dept. of Commerce. Washington, D. C.: Superintendent of Documents, U. S. Govt. Printing Office, 1964.

Sturm, Mary Mark, and Grieser, Edwina H. Guide to Modern Clothing. St. Louis: Webster Division, McGraw-Hill Book Company, 1962.

Taba, Hilda. Curriculum Development: Theory and Practice. New York: Harcourt, Brace, and World, Inc., 1962.

Travers, Robert M. W. Educational Measurements. New York: The Macmillan Company, 1955.

Periodicals

Fleck, Henrietta. "Evaluation in Practice," Journal of Home Economics, XLVI (May, 1954), p. 300.

Tests

Chadderdon, Hester. Evaluation Materials: Ninth Grade and Tenth Grade. Iowa State University: Home Economics Research Program, Project 1415, 1961.

Clothing: Every Pupil Scholarship Test. Emporia, Kansas: Bureau of Educational Measurements, Kansas State Teacher's College, 1927-68.

Clothing Test. Six New Tests for Junior and Senior High School Courses in Home Economics. Prepared by the Department of Home Economics at Purdue. Lafayette, Indiana: Measurement and Research Center, 1967.

Textiles and Clothing Test. Cooperative Tests in Home Economics. Prepared by Committees of the American Home Economics Association. Princeton, New Jersey: Educational Testing Service, 1948-52.

Unpublished Material

Bray, Edyth. "The Development and Use of a Pencil-and-Paper Test for Determining Placement of College Students in Clothing Courses and for Measuring Achievement after Instruction." Unpublished Master's thesis, University of Minnesota, 1949.

Davis, Mildred Jean. "Clothing Placement Tests for Entering Freshmen in the Division of Home Economics at West Virginia University, 1948-1951, Inclusive." Unpublished Master's thesis, West Virginia University, 1952.

Frandolig, Carol H. "Validation of Three Instruments to Predict Clothing Construction Ability at the High School Level." Unpublished Master's thesis, Iowa State University, 1962.

Gould, Gravalynn Foremen. "A Performance Pretest for Placement of College Students in Beginning Clothing Courses." Unpublished Master's thesis, Oklahoma State University, 1963.

Hale, Myrna Beth. "Analysis of the 1960 and 1961 Oregon State Clothing Construction Placement Test." Unpublished Master's thesis, Oregon State University, 1963.

Rothgarn, Mildred Marguerite. "The Development of a Method of Pretesting Student Ability to Understand and Apply Principles of Clothing Construction." Unpublished Master's thesis, Michigan State University, 1962.

Saddler, Jane. "Placement Test for College Home Economics Students: I. Elementary Clothing Construction." Unpublished Master's thesis, Iowa State College, 1945.

Semeniuk, Alexandra O. "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.

Witt, Mildred Bea. "The Revision and Development of Selected Evaluation Devices for Appraising Certain Clothing Competencies of College Freshmen." Unpublished Master's thesis, Oklahoma State University, 1961.