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DEVELOPMENT OF AN INSTRUMENT TO ASSESS THE
COMPOSITE SUBJECT MATTER ACHIEVEMENT OF
SECONDARY COOPERATIVE DISTRIBUTIVE
EDUCATION STUDENTS IN OHIO

DISSERTATION
Presented in Partial Fullfillment of the Requirements For
the Degree Doctor of Philosophy in the Graduate
School of the Ohio State University

By
Kenneth Eugene Hoffman, B.A., M.S.

* * * * * * *

The Ohio State University
1968

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The unfailing strength, support, plus typing and technical assistance of my wife, Ruth Ann, earns for her the dedication of this effort.
VITA

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CHAPTER I

THE PROBLEM IN ITS SETTING

Distributive Education, designed to meet the instructional needs of those engaged in or preparing to engage in distributive occupations, was recognized on the national level through legislation for vocational education on June 8, 1936. Since that time, distributive education has emerged as a vital program of public vocational education, enrolling approximately 420,000 students in the school year 1966-67.¹

In 1960 the secondary school enrollment in distributive education was about 42,500 students. At that time the secondary enrollment was close to sixteen percent of the total distributive education enrollment. Of the entire enrollment four years later (1964), in-school secondary students comprised approximately thirty percent of the total 334,000 students in distributive education.

The rate of growth of secondary enrollment in distributive education since 1964 has been rapid in numbers and as a percentage of total distributive education enrollment. Twenty-five percent of the total trainees in the school year 1966-67 were secondary students. The number of secondary students enrolled has increased by approximately

eighty-five percent between the school years 1964–65 and 1966–67
and by one hundred and forty percent between the school years 1960–61

All of the high school student-trainees prior to 1963 were
required to be employed in distributive occupations during their
training. The cooperative on-the-job training program was widely
accepted and adopted. It proved to be highly suitable for training
on the secondary level. The minimum requirements of early federal
vocational legislation, carried out through state plans, provided
for three organizations of cooperative distributive education in
the secondary school. These three were described in this manner:

Plan A - A program covering two school years providing an
average of at least one regular class period a day of
vocational instruction in classes limited to the
cooperative group.

Plan B - A program covering one school year providing an
average of at least two regular class periods a day of
vocational instruction in classes limited to the
cooperative group.

Plan C - A program covering one school year providing an
average of at least one regular class period per day
of vocational instruction in classes limited to the
cooperative group and enrolling only those who have
completed a sequence of at least two high school units
of credit of two semesters each in distributive subjects.

Other general conditions are:

1. Students should have reached the age of sixteen years.

2. Students should have been employed in a distributive
occupation for an average of not less than fifteen hours
Per week during the school year, the major portion of said hours of employment to be during the normal day school hours.\(^2\)

All three of these plans, Plan A, Plan B, and Plan C, relied heavily on related classroom instruction in distributive subjects as a vital part of the cooperative program on the secondary level. As late as 1960, national leaders in distributive education were in strong agreement that in a high school cooperative program both classroom instruction and on-the-job training are of equal importance.\(^3\)

Currently, secondary programs in distributive education are generally of two types, the preparatory laboratory training consisting of "project" or "participating" activities, and the cooperative on-the-job training program.\(^4\) This paper is concerned with cooperative distributive education in which the laboratory experiences are obtained through an on-the-job employment experience. The basic concepts of the high school cooperative training program in distributive education has been expressed adequately by U.S. Office of Education personnel.


The term cooperative reflects the working relationship between the school and the business community to prepare young people for careers in distribution. The classroom represents the center of the instructional program while the employment status of the students provides the laboratory experience. Employment, as a requirement for enrollment in the cooperative program, is viewed as a method of instruction. The job is an avenue through which every student must test basic concepts in practical situations.5

Nature of related classroom instruction

Roberts stated that the organized class instruction for part-time cooperative students is referred to as related training.6 Related instruction consists of classroom and laboratory courses designed to increase knowledge, understanding, and ability to solve technical problems concerned with selected occupations. Roberts said the course content selected for the related subjects depends upon student needs.

Mason and Haines said that instruction in distributive education must be concerned with the learner's need to acquire occupational skills, information, and job intelligence basic to all distributive occupations as well as with his needs for specialized skills and information requisite to his career objective in


distribution. These two types of related instruction are referred to as composite and speciality subject matter instruction.

The Distributive Education program in Ohio

As described in the Ohio Plan for Distributive Education, this program in Ohio is available to persons over fourteen years of age who have entered or who are preparing to enter employment in distributive occupations or in occupations in which a distributive function appears (Section 8.21). Distributive occupations are defined as those followed by proprietors, managers or employees engaged primarily in marketing of goods and services (Section 8.22).

The organizational framework for the cooperative program in Ohio is identical to that fashioned under the rules and regulations for the administration of vocational distributive education promulgated by the United States Office of Education referred to earlier in this paper. Preparatory cooperative classes in Ohio are organized according to the A, B, and C Plans required under these regulations.

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In addition, the Ohio Plan includes three types of non-cooperative programs in which students are trained through participating or "project" experiences as an alternate to on-the-job training. In the 1966-67 school year, only one such program was operated in Ohio.

Classes using supervised cooperative training are limited to enrollees who completed no less than four hundred and fifty hours of regularly scheduled employment during a ten-month period under the following conditions (Section 8.23-22-1):

1. School approval of on-the-job activities;
2. Credit recognition for proficiency in on-the-job assignments;
3. Pay for work performed.

The problem setting

The national vocational legislation enacted in 1963 allowed states making use of federal funds for financing vocational education to initiate curricular plans which need not be limited to the three types prescribed by earlier legislation.10 No longer were students in high school programs required to be employed in a distributive occupation during the period of their enrollment.11

A new era of curricular planning was opened with the enactment of this legislation. However, distributive educators have been slow

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to adopt new programs which differ significantly from the traditional cooperative plans. The concern of leading distributive educators over the problems involved in program improvement have been voiced by the Research Committee on Distributive Education of the North Central Region as they suggested these topics for research:

1. A comparison of the effectiveness of the "A," "B," and "C" plans for distributive education in terms of preparing students for employment in distributive occupations;

2. The establishment of standards of instruction;

3. Analysis of achievement in fundamentals at graduation time by seniors in representative high schools;

4. Trends in teaching of a distributive subject including objectives, placement in the curriculum, subject matter content, and achievement standards;

5. Criteria for determining standards for specific distributive education subjects.12

In recent years curriculum expansion problems have been augmented by additional pressures which have been applied to curriculum planners to justify revisions or additions to the school program. Pressures for the expansion of vocational education have also arisen as a result of significant occupational changes. "The largest increase in employment (1960-70) will take place in the professional, technical, managerial, office, and sales fields."13

12 North Central Region Research Committee on Distributive Education, Distributive Education Issues (Columbus: The Ohio State University, 1957), p. 4. (Mimeographed.)

Although pressure for vocational education improvement and expansion exists today, there is also strong pressure being applied for empirical evidence which supports changes or expansions in school curricula. This regard for proper evidence to substantiate changes lends great weight to evaluation and experimentation through research. Meyer and Logan, in reviewing the nature of past research in distributive education commented on the predominance of descriptive research and concluded:

Whether or not the dominance of descriptive research is an unhealthy situation is subject to question. Certainly, good descriptive studies serve a useful purpose: they may be forerunners of experimental research; they may lead to the development of appropriate instruments for measuring desired learning outcomes in a vocational field; they may serve as stimuli to further research on the part of the researcher and others; and so on. But can distributive education improve and expand on the strength of descriptive research along? The answer is obvious— not for long. Experimental studies are needed to indicate which directions to follow. Unfortunately, only one or two experimental studies in distributive education have come to the attention of the reviewers.14

Meyer and Logan presented three reasons for the heavy emphasis on descriptive studies in distributive education at the expense of comparative and experimental studies. These three reasons were:

1. The lack of appropriate measuring instruments—experimental studies are of little or no value if the testing instruments do not measure the precise desired outcomes from teaching.

2. The scarcity of situations in which there is a sufficient number of students or classes to form bona fide experimental and control groups (although it was said that this limitation is becoming less and less serious).
3. The dearth of qualified researchers with a background in distributive education.\textsuperscript{15}

Meyer and Logan continued, quoting the words of President Maucher of the State College of Iowa (1962) in his charge to the Central Region Distributive Education Conference:

I would like to express the hope that in your deliberations, somewhere, you will stress the evaluation of outcomes, and I mean hardheaded evaluation of outcomes: measurement of whatever facets of achievement (that) can be measured. I think we have hidden behind the idea that we can't measure all of the outcomes, so we don't measure any of them.\textsuperscript{16}

Meyer and Logan concluded that there had been little use made of tests by distributive education researchers, up to the time of their review. It was said that the development of tests designed for the measurement of specific distributive education outcomes is a necessity and is long overdue.

Ferguson compared the effectiveness of two patterns of instruction in distributive education using three available standardized tests which were not specially designed for distributive education on the secondary school level.\textsuperscript{17} He concluded that the tests which were utilized could not measure effectively the outcomes of distributive

\textsuperscript{15}Ibid., p. 166.

\textsuperscript{16}Ibid., p. 167.

\textsuperscript{17}Edward T. Ferguson, "A Comparison of the Effectiveness of the Project and Cooperative Methods of Instruction in Selected Competencies in Distributive Education at the Secondary Level" (U.S.O.E. Project 7-0694; East Lansing: Michigan State University, 1968), p. 6.
education instruction and recommended that valid instruments which decisively measure the outcomes expected for distributive education classes need to be developed.

Herbert A. Tonne's comments on the nature and need for research in the larger area of business education parallels well the scope and orientation of the present study. Tonne proposed that the area in which most adequate research could be accomplished in business education is in content determination based upon the identification of meaningful instructional objectives. The determination of the best methods of teaching this content should be the next most significant area for worthwhile research. Testing, Tonne continued, is the major area which offers considerable possibility for scientific research. Having decided what the objectives and the content are in teaching, instruments must be developed which will measure the extent to which the teaching processes have attained these objectives.

**Purposes of the study**

The primary purpose of this study is to develop and test an instrument for evaluating student achievement in the related subject matter phase of distributive education on the secondary level. The

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general rationale for related classroom study in cooperative education

in distributive education has been expressed in this way:

Nearly all distributive educators agree that most distributive
occupations do not require a high degree of manipulative skill
and that a large number deal with the use of factual informa-
tion, choice making among numerous variables, the use of good
judgment, and decision making ability.\textsuperscript{19}

The present study is an attempt to determine if an instrument
can be developed that adequately measures, for purposes of evaluation,
student success in learning one type of related subject matter.

Another purpose of this study is to determine whether the
achievement instrument can measure well enough to point out differ-
ences in the subject matter achievement of students enrolled in
distributive education cooperative programs of different lengths
and with varying degrees of concentration of instruction.

In order to accomplish these major objectives, answers are
sought for these intermediate questions:

1. What is the composite subject matter content for
distributive education instruction in Ohio?

2. Is the content of related composite subject matter
for distributive education in Ohio similar enough so
that achievement can be compared from school to school?

Basic assumptions

In designing and carrying out this study, it is assumed that:

1. The school exists in order to accomplish certain aims or
purposes and that these purposes can be expressed in
terms of desired changes in pupil behavior.

\textsuperscript{19}Meyer and Logan, \textit{op. cit.}, p. 78.
2. The second is that instructional programs in the schools are formulated in order to accomplish these objectives.

3. The third assumption is that the objectives are not likely to be accomplished successfully unless provision is made for continuing evaluation of the instructional program.

4. The final assumption is that measurement in education is essential if the evaluative process is to be accurately and effectively carried out.

Null-hypotheses to be tested

Based upon the scores attained by distributive education students on the instrument developed in the course of this investigation:

1. There is no significant change in achievement made by distributive education students in related composite subject matter knowledges during the testing period of this study.

2. There is no significant difference in the accomplishment of distributive education students from two different program plans in the knowledges appropriate to marketing and distribution composite subject matter during the testing period of this study.

Scope and limitations of this study

The instructional content measured in this study will be limited to the related subject matter which has been called "composite subject matter." Composite subject matter is involved with those learnings which are common to business enterprises when establishments are grouped according to the broad classification of their economic

\[20\] The Cooperative Project for Standardization of Terminology in Instructional Programs of Local and State School Systems, op.cit., p. 432.
activity (e.g., marketing and distribution). Composite subject matter and speciality subject matter (those learnings appropriate to the systematic study of jobs upon which distributive occupational objectives are based) make up the related instructional phase of distributive education. Related instruction, on-the-job training and youth activities are the accepted phases of cooperative distributive education in the secondary school.

This study will be limited to senior students enrolled in cooperative distributive education in Ohio during the 1967-68 school year. One group will be from programs (Plan B-Ohio) covering one school year on the senior level, providing an average of at least two class periods per day of the regular schedule for vocational instruction in distribution. The other group will be from programs (Plan C-Ohio) covering one school year which provides an average of at least one class period per day in vocational instruction in distribution limited to the senior cooperative group enrolling those who have completed two semesters of preparatory instruction on the junior level.

Although the content appropriate to distributive education will be drawn from many sources, the final instrument will be based upon the subject matter content as agreed upon by a sample of Ohio Distributive Education coordinator-instructors. Therefore, the conclusions drawn in this study are applicable only to the population studied or to similar populations.

\[21\text{Ibid.}, \text{p. 427.}\]
This achievement study is also limited to assessment of the

cognitive domain of educational objectives (as distinguished from

the affective and psychomotor) which were identified by Bloom et al.22

Of the six general classifications of the cognitive domain identified

by Bloom and his colleagues, this study is restricted to the know­

ledge classification of educational goals. The knowledge objective

is sub-divided into nine specific objectives which are incorporated

as items into the achievement instrument developed in this study.

It has been recognized by leaders in the field of distributive

education that the attainment of basic knowledge of marketing and
distribution is one of the main objectives attributable to distri­

butive education offerings in the high school.23 Lucy C. Crawford

recently completed an intensive study of the knowledge, skill and
attitude competencies, as well as the basic concepts and generaliza­

tions, which were considered essential for all distributive workers

and therefore appropriate to distributive education programs.24

Four hundred and forty-two knowledges and understandings as well


24 Lucy C. Crawford, "A Competency Pattern Approach to Curriculum Construction in Distributive Teacher Education" (Blacksburg, Virginia: Virginia Polytechnic Institute, 1967), p. 84.
as over one hundred basic concepts and generalizations were identified by Crawford through an extensive review of the literature. One hundred and fifty-six of the knowledges and understandings in nine instructional areas were considered essential by a sample of employees and supervisors from seven categories of business included in the study. In addition, one hundred and seventy-four knowledges and understandings were considered highly desirable by the distributive workers interviewed. The knowledge and understanding of one hundred and six basic concepts and generalizations concerning marketing and economics were also judged as essential for all distributive workers.

No attempt has been made to compare or evaluate the instructional content of distributive education, as found in this study, against any other educational or occupational criteria. The instrument which was developed is based upon the objectives of distributive education as agreed upon by Ohio coordinator-instructors and the instructional content as taught by Ohio distributive educators. This approach was taken to reflect as faithfully as possible the emphasis given to the instructional sequence in distributive education. Such reflection and concern for course objectives is the foundation for the content validity of the achievement instrument developed in this study.

The results of this technique will be limited by those shortcomings common to objective type achievement tests such as possible errors in judgment; errors in sampling facts or information students should know; in unintentional ambiguity or poor question constructions;
and in the lack of careful control of variables which might affect the test results.

**Significance of the study**

If it is shown that there is a significant gain in the subject matter knowledge which leaders and coordinators judge as instructionally important, a technique will be available for evaluating, objectively, one of the outcomes of distributive education. The suitability of such an instrument for evaluation can then be further tested under experimental conditions. The value of this instrument for general use can be demonstrated if its later development is carefully controlled and tested.

Measurement procedures such as carried out in this study can be useful not only in evaluating a total program of instruction but also in providing information concerning the progress and development of the individual pupil. More specifically, measurement procedures can help answer questions such as:

1. To what extent are the instructional objectives of the school and the individual classroom teacher being achieved through the various instructional processes and methods employed?

2. How can reasonable achievement levels be determined for each pupil which take into account his general learning potential and his special aptitudes?

3. When more than one method of instruction is available, which one tends to be the most effective in maximizing pupil achievement?

In interviewing representatives from a sample of U.S. Junior Colleges, Siebel obtained a summary of the testing needs and
problems of sixty-three junior colleges. Since the needs and problems were solicited in an open ended manner, they take on greater importance than if the information had been obtained from the college representatives' reaction to a specified list of problems and needs.

Siebel summarized these problems and needs into seventeen areas. Two of them have special significance for the present study:

Need for Testing in Vocational Areas. The tests included here are those that measure skills and abilities that are taught in vocational training programs. We have included both the generally expressed need for this kind of test as well as the expressed need for tests in specific vocational areas. This need was mentioned at ten of the colleges, all of which were public institutions.

Need for Various Kinds of Subject-Matter Achievement Tests. This category includes only the need for achievement tests for institutional use— as opposed to Number 4, above, which considered the need for achievement tests for classroom use by teachers. This need was most often expressed in connection with placement testing, and was one of the most frequently mentioned needs— fifty-nine percent of the colleges so indicated, with the proportion being seventy-one percent among public colleges.\(^2\)

An achievement test in vocational distributive education, when used in connection with other specialized measurements, should be helpful to junior college personnel in the areas defined in Siebel's study, especially that of initial placement of students recently graduated from secondary programs.


\(^2\)Ibid., p. 60.
Definition of terms

1. **Distributive Education.** "The term distributive education identifies a program of education. Its purpose is to provide instruction in the field of distribution. This program serves employed distributive personnel within the framework of their careers, whether they be beginning or experienced workers or occupy positions of management. Distributive education is composed of the high school program, post-high school program, and the adult program."²⁷

2. **Distributive Occupations.** "Occupations for which this education is offered include those followed by proprietors, managers, or employees engaged primarily in marketing or merchandising goods or services. Such occupations may be found in various business establishments, including but not limited to, retailing, wholesaling, manufacturing, storing, transporting, financing, and riskbearing."²⁸

3. **High School Cooperative Method.** "The term cooperative reflects the working relationship which exists between the secondary school and the business community to achieve the basic objective of preparing young people for careers in distribution. Properly conceived, the classroom represents the center of the instructional program, and the employment status of the students serves to provide the necessary laboratory experiences."²⁹

²⁸Ibid.
²⁹Ibid.
4. Related Instruction. "Classroom and laboratory courses designed to increase knowledge, understanding, and ability to solve technical and theoretical problems concerned with a particular occupation." 30

5. Curriculum. "The series of courses designed to cover the instruction in a designated field. It may refer also to the whole body of courses offered in an educational institution." 31


7. Unit of Instruction. "The smallest division of instruction for which a full lesson is taught. A single operation in a trade may constitute a unit of instruction." 33

8. Achievement. "Accomplishment or proficiency of performance in a given skill or body of knowledge." 34

31 Ibid.
32 Ibid.
33 Ibid.
9. **Achievement Test.** "A test designed to measure a person's knowledge, skills, understandings, etc. in a given field taught in school, for example, a mathematics test or an English test."^{35}

10. **Comparable Scores.** "Comparable scores are expressed on the same scale, and have the same mean and the same variability. If scores on several tests are truly comparable for a group of subjects, the distributions of their scores on each test would be identical, though the scores of any one student on the several tests might differ."^{36}

11. **Equivalent Forms.** "The items in equivalent forms of a test are the same in type, cover the same content, have the same distribution of difficulty values, and yield scores having the same mean, variability, and reliability."^{37}

12. **Multiple Choice Item.** A multiple choice item has two parts: the stem, consisting of a direct question or an incomplete statement; and two or more options, consisting of answers to the question or

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^{35}Ibid., p. 556.


^{37}Ibid., p. 450.
completions of the statements. The examinee's task is to choose the correct, or the best, answer option in terms of the question posed by the item stem.\textsuperscript{38}

13. **Objective Test.** "An objective test is one which can be provided with a simple predetermined list of correct answers, so that subjective opinion or judgment in the scoring procedure is eliminated. The scoring of true false, multiple choice, or matching exercises is completely objective."\textsuperscript{39}

14. **Random Sample.** "A random sample is a sample selected in such a way as to guarantee equal probability of selection to all possible samples of this size that could be formed from the members of the universe involved. It is also true that each element in the universe has equal probability of being included in a random sample."\textsuperscript{40}

15. **Reliability Coefficient.** "The reliability coefficient is the estimate of the coefficient of correlation between the scores for students in a particular group on two equivalent forms of the same test. If equivalent forms of the same test are not available, the reliability of a single form can be estimated by splitting it into equivalent halves and using the correlation between scores on equivalent full-length tests."\textsuperscript{41}

\textsuperscript{38} Ibid., p. 455.

\textsuperscript{39} Ibid., p. 456.

\textsuperscript{40} Ibid., p. 459.

\textsuperscript{41} Ibid., p. 460.
16. **Test Item.** "A test item is the smallest independent unit of a test. Each statement to be judged true or false, each question to which an answer is to be selected, each incomplete statement to which a completion is to be selected, each blank in a sentence or paragraph to be filled in, is a separate test item."[^42]

The following terms describe the content of related composite subject matter instructional units in distributive education. The terms summarize the agreement of a sample of Ohio coordinators with statements of content drawn from a review of literature and courses of study. These terms represent the subject matter units from which the achievement test of this study was written.

1. **Salesmanship.** Instruction given to assist the student in developing selling abilities and techniques, and familiarity with the modern concept of selling. Topics generally included are kinds of selling, sales occupations, steps in the sale, and suggestion selling.

2. **Sales Promotion and Advertising.** Instruction in the function and value of sales promotion to a retail enterprise and its relationship to sales volume and profit. Included in this area of instruction are: the types and definition of sales promotion; the types and principles of advertising including sales appeal and motivation; when, where, and how to advertise; store advertising and display; the mechanics of advertising in different media.

3. **Job Skills and Product Knowledge.** That information useful in developing the background for learning product information, common job skills, and general practices common to broad store types such as department or variety stores. Three topics commonly covered in the area of product knowledge are (1) the importance of product knowledge, (2) sources of product information, and (3) methods of product study.

4. **Merchandising.** Learning of the activities essential to buying, storing, stocking, and selling merchandise in a retail store. This topic embraces the areas of store location, layout, and stock arrangement, buying, store systems, pricing, stocking, and inventory.

5. **Human Relations.** Instruction in basic principles common to the cooperation and joint effort needed among employers and employees. This area is composed of information about effective communication, and establishing and maintaining good relations with fellow workers.

6. **Retail Mathematics.** Instruction and practice in the mathematical skills and computations used in retail operations by sales and clerical employees. Topics covered include a review and advanced instruction in basic computations such as fractions, decimals, ratios and others, and common basic exercises such as sales taxes, mark-up, discounts, stock turn, weights and measures, tax calculations and others.
7. **Economics of Distribution.** Education given to introduce the nature of our economic system and the role and relationships of marketing and distribution to that system. Included in this instruction are such topics as basic principles of wealth, production, and income, operation of the free enterprise system, the social aspects of our economy, the importance of marketing, the role of distribution, and special functions of our system that affect marketing and distributive occupations.

8. **Marketing.** A more detailed consideration of this phase of our economic system which includes the size and importance of marketing, the types and functions of marketing institutions, and the functions and relationships of the wholesale, retail, and service phases of marketing.

9. **Job Knowledge and Job Adjustment.** The principles needed to understand and to be able to master the job learning techniques necessary for job success. Main aspects encompassed by this area include choosing and planning a career, job analysis techniques, application of the job analysis technique, job training procedures, and knowledge of entry jobs and the routes of advancement.

10. **Orientation to the Distributive Education Program.** The information necessary for the student-trainees to understand the purposes and operation of the program and their rights and responsibilities as students in this program. Material in this area is made
up of the goals and objectives of the program, the nature and purpose of classroom and cooperative on-the-job instruction, the rules and regulations of the program, and introduction to the youth club program.
CHAPTER II

REVIEW OF LITERATURE AND RELATED RESEARCH

Numerous writings are available which treat or which report research results which deal with educational achievement and achievement testing. The writings reviewed in Chapter II are limited to those which relate to the following major headings: Basic objectives of Distributive Education, Cooperative Distributive Education in Ohio, Program development in secondary Distributive Education, Evaluation of student outcomes through achievement studies, Achievement studies in Distributive Education.

Basic objectives of Distributive Education

The major objective of the program is to fit persons for useful employment in distributive occupations.¹ In more detail the objectives may be stated as follows:

1. To develop the ability of distributive workers to give intelligent, economical, and helpful service to customers.

2. To develop greater job satisfaction; to increase earning power; to insure advancement on merit; to create a feeling of permanency of employment in the mind of the distributive worker.

3. To reduce business losses due to inefficient employees as well as unsound management policies and practices.

The Vocational Education Division of the United States Office of Education states that the major objectives of distributive education are:

1. To increase the skills, technical knowledge, occupational information, understanding, morale, appreciation, and judgment of management and workers.

2. To prepare workers in distribution to transfer to a related kind of work in another distributive occupation or to move to higher level positions in a given occupation.

Ralph E. Mason summarized the objectives of distributive education on the secondary level in these words:

The major objective of this program as generally conceived at the present is to prepare certain high school students vocationally for initial marketing jobs in areas such as manufacturing, storing, transporting, financing, risk-bearing, wholesaling, retailing, and service. This vocational preparation aids the student-learner in acquiring skills and knowledges applicable to all distributive occupations and also in acquiring specialized skills and knowledges applicable to the training station in which he is placed. Also, this background prepares the student-learner for advancement on the job.

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2. Administration of Vocational Education: Rules and Regulations, op. cit., p. 44.


Warren G. Meyer developed a statement of desired outcomes for distributive education which is well suited to the purposes of the present study. 5 The desired outcomes presented by Meyer were:

1. Career Development Competencies— the student's understanding himself and his relationship to his occupational field through continuous testing and adjusting to career goals.
   a. Understanding the field of distribution.
   b. Finding out what duties and responsibilities are carried out by persons employed in distributive occupations of the student's choice.
   c. Determining the nature of selected distributive occupations.
   e. Predicting whether or not he would like a particular occupation.
   f. Selecting a tentative career goal.
   g. Determining the course of action leading to the tentative career goal.
   h. Applying for a position.
   i. Evaluating progress toward his career goal.
   j. Applying appropriate techniques in terminating employment.

2. Technical Competencies— skills, understandings, and attitudes achieved through mastery of occupational duties and responsibilities.
   a. Basic marketing and merchandising competencies.
   b. Psychological and communications competencies.
   c. Study and research competencies.
   d. Artistic competencies.
   e. Clerical competencies.
   f. Manipulative competencies.

3. Occupational and adjustment competencies— personal adjustment to work environment by personal adjustment to superiors, co-workers, and conditions.

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a. Improving his business personality.
b. Learning a job quickly and completely.
c. Profiting from supervision.
d. Getting along with co-workers.
e. Appreciating managerial problems.
f. Participating in employee and other business groups.
g. Practicing personal living that engenders good work living.

Some efforts are being made to validate the instructional objectives and content of distributive education through job analysis techniques meant to serve as the basis for curriculum development. Ertel conducted a study to identify major tasks performed by merchandising employees working in three Standard Industrial Classifications of retail establishments. The information gathered was categorized into twelve types of work: selling, stockkeeping, checkstand operation, receiving and marking merchandise, delivery, keeping records, computing, display, advertising, buying, pricing, and merchandise control. The percentages of supervisory and non-supervisory employees who performed each of 332 tasks were recorded. The information was collected for use later as the bases for identification of clusters of knowledges associated with performance of work done by substantial percentages of employees. The author assumed that, along with requisite skills, acquisition of such knowledges will

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help pupils succeed in entry jobs and serve as bases for retraining, occupational mobility, and career-long advancement. However, no report of the later stages of the knowledge identification was available.

Lucy C. Crawford recently completed a study to determine the competencies needed by high school distributive education teacher-coordinators to effectively conduct a distributive education program.\(^7\)

One of the steps in Crawford's research was to determine technical teaching competencies needed by the distributive education teacher-coordinator in order to develop in students the competencies needed by workers to enter and advance in distributive occupations. Seven categories of distributive businesses were chosen as typical of those in which a majority of high school distributive education cooperative students are placed. They were department stores, variety stores, food stores, restaurants, service stations, wholesale firms, and hotels and motels. Interviews with employers and supervisors were conducted in firms from the seven categories of businesses to obtain their evaluation of a list of common knowledge, skill, and attitude competencies needed for success in certain entry, career, and specialist jobs. These competencies were clustered around nine areas: advertising, communications, display, human relations, mathematics, merchandising, operations and management, product and service knowledge, and selling.

\(^7\)Lucy C. Crawford, *op. cit.*, p. 1.
The respondents were asked to evaluate each of the competencies as either "essential," "highly desirable," or "desirable, but not essential." In the knowledge area the employers and supervisors considered a high proportion of the competencies as "highly desirable" or "essential." In addition, a group of basic concepts and generalizations concerning marketing and economics was included in the report of the study which the author judged essential for all distributive workers and therefore for all distributive education coordinators.

Throughout these statements of distributive education objectives and content are interwoven what Bloom, Engelhart, Furst, Hill, and Krathwohl called the "cognitive, affective and psychomotor domains." The cognitive domain includes the educational objectives which deal with the recall or recognition of knowledge and the development of intellectual abilities and skills. The affective domain includes objectives which describe changes in interest, attitudes, and values, and the development of appreciations and adequate adjustment. The psychomotor domain is concerned with educational objectives in the manipulative or motor-skill areas.

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8 Ibid., p. 94.

The authors of this taxonomy made it clear that the objectives of education are not only the goals toward which the curriculum is shaped and toward which instruction is guided, but they are also the goals that provide the detailed specification for the construction and use of evaluation techniques.\(^\text{10}\) Illustrations of test items were provided which may serve as evaluators of the educational objectives presented.

The taxonomy of Bloom et al. dealing with the cognitive domain is composed of six general classifications: Knowledge, Comprehension, Application, Analysis, Synthesis, and Evaluation. The main emphasis of the present study will be upon the classification of knowledge within the cognitive domain.

The acquisition of knowledge or information is classified within the taxonomy as the most common educational objective in American education. In almost every course it is called an important and basic educational objective. Knowledge is termed important because with increases in knowledge or information there is a development of one's acquaintance with reality. Another justification for the teaching of knowledge is that it is quite frequently regarded as basic to all the other ends or purposes of education and therefore is fundamental to such abilities as problem solving or thinking.\(^\text{11}\) Even the psychomotor

\(^{10}\) Ibid., p. 27.

\(^{11}\) Ibid., p. 33.
skills and abilities require some knowledge of materials, processes, and tools. Interests, attitudes, and appreciations are regarded as having some base in knowledge or information. A person must have some knowledge about himself, his abilities, and his aspirations as an aid in self adjustment and self development.

The final justification of knowledge as an educational objective made by Bloom and the others is that our culture places tremendous weight on knowledge of information as an important characteristic of the individual.\(^\text{12}\)

The category of knowledge within this taxonomy was subdivided into three broad areas:

1. Knowledge of specifics.
   a. Knowledge of terminology.
   b. Knowledge of specific facts.

2. Knowledge of ways and means of dealing with specifics.
   a. Knowledge of conventions.
   b. Knowledge of trends and sequences.
   c. Knowledge of classification and categories.
   d. Knowledge of criteria.
   e. Knowledge of methodology.

   a. Knowledge of principles and generalizations.
   b. Knowledge of theories and structures.\(^\text{13}\)

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Cooperative Distributive Education in Ohio

Kenneth Green developed a curriculum planning guide by surveying coordinators and applying their responses to secondary curriculum

\(^\text{12}\) Ibid., p. 34.

\(^\text{13}\) Ibid., p. 79.
development within the state of Ohio. The purpose of the study was to determine the placement of students in the distributive education cooperative programs within the state as well as to make recommendations as to what should be offered in the curriculum. Information was gathered by questionnaire from one hundred and thirty-four distributive education coordinators from across the nation concerning what was being done to up-grade the distributive education program within their schools. The job placement for 1,316 Ohio distributive education students during the 1964-65 school year was collected and presented.

In describing the placement of cooperative distributive education students in Ohio, Green stated that the type of training station at which the highest proportion of students were employed was the department store. Green summarized in this manner:

1. Cooperative distributive education students get their work experience predominately in the retailing field (91%), with the wholesale and service establishments accounting for a minority (9%).

2. Approximately one-fifth of the students were placed in department stores and just less than this in grocery stores, with only about one-tenth being placed in variety stores. The other retail areas do not have a significant number of placements. This is also true of the wholesale and service areas.15

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14 Kenneth Green, "A Study of Curriculum Planning for High School Distributive Education Programs" (Bowling Green: Bowling Green State University, 1965).

15 Ibid., p. 3.
Green's study of the preparatory courses in distributive education indicates business arithmetic, salesmanship, economics, and business law are predominately half year courses in grades ten and eleven. Specialized areas recommended by respondents in the national study for any new proposed plans for the twelfth year distributive education cooperative classes, were retail merchandising (buying and selling), sales promotion, retail mathematics, product studies, business psychology, business communications, credit and career planning, retail operations, store management and research in marketing.

Green recommended that (1) units of study in specialized areas in the twelfth year cooperative classes should include at least four weeks each of sales promotion, retail operation, store management, retail mathematics and economics of distribution; (2) economics as a requirement for distributive education students should definitely be considered; (3) at least six weeks time should be devoted to each unit of study in the twelfth year cooperative class with reference to merchandising, sales promotion, and retail mathematics; and (4) business communications may be offered in the twelfth year.

Program development in secondary Distributive Education

From 1936 until 1963 local distributive education programs were limited to the cooperative method only and three basic types of
arrangements were developed on the high school level. These have been described as Plan A, a two year program of job training; Plan B, a one year program of cooperative training; and Plan C, one year of related preparatory instruction followed by another year of cooperative training. These three programs were established to offer the same amount of related instruction in terms of total time allotment. It is not known upon what basis these three types of program frameworks were chosen; however, the effect is to equate the content offered through the three programs. Although the hours of classroom instruction are the same, students in Plan A programs have the opportunity to obtain twice as much on-the-job training as either Plan B or Plan C students. In terms of related instruction, Plan C students who complete a preparatory year of related instruction prior to being placed in a cooperative on-the-job training station, complete their instructional block over a two year period as compared to the one year for Plan B students. Plan A students and Plan B students receive their related instruction concurrently with their on-the-job training, whereas Plan C students receive only the second half of their instruction at the same time as their cooperative training.

Prior to 1963 numerous research studies were conducted which either evaluated the occupational content of these three program plans

17A study of Curriculum Development in the High School Cooperative Programs, op. cit., p. 4.
or evaluated their outcomes in terms of graduate opinion and success. However, no attempts were made to compare the effectiveness of the several types of cooperative distributive education programs in terms of student outcomes.

John E. Gradoni studied cooperative education for retail occupations in New York State in which he used interviews, observations, analysis of job performance ratings, and other means to determine the status of certain aspects of the cooperative program. He concluded that: the aims and objectives of the program must be restated in terms of more immediate and measurable goals; that teacher-coordinators should make greater use of specialized instructional techniques particularly suited to cooperative work experience; and that all trainees should obtain required work experience. He did not, however, make any recommendations as to the nature and extent of this on-the-job experience.

Ralph E. Mason approached curriculum development in distributive education through an analysis of related instruction for cooperative programs in Illinois. He attempted to find out if the

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18 John E. Gradoni, "A Study of Selected Distributive Education Programs in New York State; A Study of Specific Cooperative Part Time Retailing Programs Based on Personal Observations at Schools and Training Stations" (unpublished Ph.D. dissertation, New York University, 1957).

content and structure of related instruction made any significant
contribution to the preparation and success of distributive education
graduates for occupations beyond those on the entry level. His design
was to compare the preparation and advancement of graduates of distri-
butive education programs with the advancement of those graduates
employed in distributive occupations who had not been in distributive
education.

Mason concluded:

1. Growth and advancement on the job as a result of training
was not pronounced when comparing the D.E. graduate and
the non D.E. graduates.

2. Employer opinion, however, gave stronger indication of
growth and advancement of the D.E. graduates when
compared to non D.E. graduates.

D.E. respondents required less job supervision themselves,
supervised more other employees and were in more top management
positions than non D.E. respondents. It appeared that the distri-
butive education graduates were prepared for advancement positions
rather than for entry or beginning positions.

E. Edward Harris inventoried the practices used in teaching
occupational group (composite) learnings at the several educational
levels by polling distributive education coordinators on a national
basis.\(^{20}\) He found considerable difference of opinion among the
respondents concerning what should be taught in pre-employment

\(^{20}\)E. Edward Harris, "Course Content and Textbook Evaluation in
Distributive Education" (unpublished Master's dissertation, University
of Minnesota, 1959).
courses as compared to classes for cooperative student trainees employed during the time they were receiving their related instruction. Harris recommended an analysis and comparison of course content in schools where students are enrolled first in pre-employment courses and later in cooperative classes to reduce duplication.

Howard Dale Johansen evaluated thirty Iowa high school distributive education programs using the evaluative criteria established by the National Society for the Study of Secondary School Evaluation. In developing the instrument, fifty-six statements were used with the guiding principles in checklist form. Major weaknesses were found in the organizational pattern of high school distributive education. The weaknesses occurred in physical facilities, instructional staff, and instructional materials. Major strengths were in the curriculum content, instructional activities, and methods of student evaluation and appraisal.

Meyer and Logan, commenting on the studies in distributive education related to program evaluation and curriculum development, said:

Federal appropriation of funds earmarked for research under the Vocational Education Act of 1963 did not produce as large an increase in curriculum development and evaluation projects in distributive education as might have been expected.

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In fact, no studies dealing with the secondary curriculum in general after 1963 were located.22

Evaluations of distributive education programs have been numerous, but have concentrated in the areas of student opinions, logical survey methods, and follow-up placement studies.

**Evaluation of student outcomes through achievement studies**

Program enrichment in distributive education appears to involve carefully planned curriculum revisions based upon sound evaluation of the "old" in comparison with the "new." Very early in the development of evaluation and measurement principles a set of assumptions was drawn up by the Evaluation Staff of the Eight Year Study which gives a good idea of what is involved in basic educational measurement and evaluation.23 Their third assumption states that evaluation consists of finding out the extent to which each and every one of the educational objectives has been obtained. More recently, N. M. Downie pointed out that the purposes of evaluation included evaluating the effectiveness of a single teaching method or appraising the relative worth of several methods, and evaluating aspects of the entire institution to show how various of its undertakings could be improved.24 Goodlad pointed out four approaches for evaluating

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programs: (1) observations of whether or not students appear to be progressing successfully; (2) casual and systematic questioning of teachers and students involved in the new programs; (3) periodic examinations of students by tests designed to cover the new program; (4) comparative testing of students in new and old programs with traditional and specially designed tests.25

One of the most commonly accepted means of evaluating student outcomes is the use of an achievement instrument that measures the attainments or accomplishments of an individual after a period of training or learning.26 The most common uses of achievement tests are for establishing grades, diagnosis, sectioning, motivation, evaluation, and counseling based upon the students' accomplishment.

Numerous evaluative and diagnostic research studies have been carried out using what Campbell and Stanley describe as the pretest-posttest design.27 This design involves an initial test given prior to the learning experience, and a final test, often utilizing the same instrument, given at the end of the learning period to determine if students perform better than they did at the beginning of the experience. Discounting invalidating factors, an increase in success on the posttest would be due to the learning experience.

26N. M. Downie, op. cit., p. 113.
27Donald T. Campbell and Julian C. Stanley, op. cit., p. 183.
Through this design comparison studies can be carried out adequately and economically. The studies reviewed below were chosen because each of the researchers utilized an especially constructed achievement test and most of them used the pretest-posttest design in carrying out the study.

Higgins developed a one hundred item test of the primary phases of business and economics. The test was then administered to four hundred fifty-three secondary students in Oklahoma. Finally, the test was analyzed to determine the validity and difficulty indexes for the test items. Reliability of the test was determined by splitting it into comparable halves, correlating the scores of the two halves, and applying the Spearman-Brown prophecy formula to estimate the correlation between the entire test and a comparable alternative form.

Ousdigian completed a study to determine the relative achievement of a group of ninth grade students who had taken a basic course in business with a comparable group of ninth grade students who had not taken the basic business course. The researcher used the pretest

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and posttest pattern involving an achievement test. Test scores were analyzed and comparisons made in terms of an increase in the knowledge of fundamental economic concepts.

Byrd conducted a general exploration of the early adolescent's understanding of certain concepts in child development in home economics vocational education. The research procedure was one of developing a multiple choice achievement test incorporating content deemed important in the area of child development. Ideas dealing with eleven concepts were incorporated into two multiple choice tests which were administered to one hundred sixty-sixth grade students and one hundred sixty-eight ninth grade students. The analysis of the results of this test indicated the potential of this type of test for (1) testing more than lower levels of understanding, and (2) demonstrating a sequential progression through levels of understanding or the cumulative effect of concept understanding.

Several other studies were reviewed in which the investigators constructed special achievement instruments to measure the instructional outcomes in various types of educational programs. Two of these studies were in business education, three in home economics, one in drafting, and one in distributive education. Four of the studies were completed with secondary students, two with junior high students, one with secondary and elementary students, and one with college students.

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The pretest and posttest technique was incorporated into the designs of the studies of Cox,^31 Jacklin,^32 Blum,^33 Gamble,^34 Weber,^35 Ross,^36 and Kennedy.^37

Achievement studies in Distributive Education

Although no specially constructed examinations have been constructed to measure the achievement of distributive education

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33Robert E. Blum, "Development and Standardization of an Achievement Test for Placing College Students in General Drafting Courses" (unpublished Ph.D. dissertation, Texas A & M University, 1965).


37Elaine Kennedy, "Development of a Linear Program to Supplement a Course in Family Relationships for the Deaf Students in Homemaking" (unpublished Masters dissertation, Cornell University, 1965).
students generally, studies have been conducted recently using
standardized objective tests to determine the attainment of economic
understandings. These understandings are generally recognized as
valid objectives of distributive education. Klaurens evaluated
experimental text material on economic competencies for student
trainees in cooperative education programs which had been developed
by Minnesota teacher-coordinators and University of Minnesota staff
members.38

The Test of Economic Understandings-Form B was given to
experimental groups which used the material and to control groups
that did not use the material. This was done both prior to and after
the material was studied by the experimental group. The experimental
group achieved a mean gain score of 1.9 points which was significant
at the .05 level of confidence while the control group did not show
a significant gain. Teacher-coordinators who used the materials
with average or better than average academic students reported gains
as high as 6.7 score points. The reading level of the test was high;
the students of below average academic ability had a difficult time
reading the test.

38 Mary K. Klaurens, "An Evaluation of Experimental Materials
in Economics for Minnesota Part-Time Occupational Training Programs
and Recommendations for Revisions" (unpublished Masters dissertation,
University of Minnesota, 1959).
The other study involving the Test of Economic Understandings—Form B was carried out by Vivian in 1966. The purpose of his study was to compare the understandings of basic economic concepts of two groups of students in selected Indiana high schools; those who had completed the distributive education program and those of similar socio-economic backgrounds and general ability levels who had not taken the program. Pretest and posttest scores and student information were obtained from 5,047 students on the economic test mentioned above. These students were enrolled in twenty-one high schools in Indiana and each school provided the information with which the students were classified into categories according to class rank, educational program, parental occupation, and scholastic abilities. Vivian concluded that formal instruction in economics, participation in the distributive education program and in the Junior Achievement program were not significantly related to the level of economic understanding of high school seniors. He stated that socio-economic background of the students as measured by parental occupation is not significantly related to economic understanding whereas scholastic ability was significantly related. Although significant differences appeared on all three variables on the pretest and posttest, instruction in economics, participation in D.E., participation in Junior Achievement, these differences appeared to be a matter of selection.

rather than an effect of instruction as no significant differences were indicated on the adjusted gain scores.

Vivian recommended that experimental studies of various teaching methods and procedures should be made in an attempt to improve the effectiveness of the distributive education program. He also urged that experimental studies should be conducted in an attempt to determine the effectiveness of various programs, teaching methods and procedures in improving the economic understanding of students of varying levels of scholastic ability.

A sixty item multiple choice test was constructed by Warren G. Meyer to determine the competency of a group of distributive education coordinators in the six marketing functions generally considered to be the basis for the discipline of distribution. The test was administered as a pretest during the first week of a workshop to thirty participants. The same test was administered again on Monday of the last week of the workshop, after the participants had had four weeks of occupational experience in marketing. The objective was to determine if there would be an increased understanding of the six marketing functions, as measured by the written test, due to actual occupational experience. A control group of fifty-four Minnesota distributive education teachers and teacher coordinators also took the test to determine how

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40. Warren G. Meyer "Pilot Training Project, Based on Directed Occupational Experience for Teachers of Marketing and Distribution" (OEG-3-6-061594-0680; Minneapolis: University of Minnesota, 1967).
the workshop participants compared with other in-service distributive education personnel. The mean scores on the pretest and the posttest of the workshop participants were compared. It was found that the posttest mean score was higher by 1.9 points and the difference, based on a t test, was found to be significant at the .05 level. In comparing the mean score of the conference participants with the mean score of the control group, no significant difference at the .05 level was found in their scores.

Trimpe, Dannenberg and Perry conducted a study to determine the effects of especially designed programmed instruction on ninety-two high school distributive education students' expressed attitudes towards a career in retail food distribution.41

Forty-five subjects were in the experimental group; forty-seven subjects were designated as the control group. The subjects completed four measuring instruments: (1) a word knowledge test, (2) a psychological scale, (3) a subject matter test, and (4) the Retail Food Distribution Occupational Career Attitude Scale. The experimental group was then exposed to five units of specially designed self-study programmed instruction. The control group had normal classroom subject matter experiences during this time. With

41 Adrian Trimpe, Raymond A. Dannenberg, Lyle Perry, Sr., "The Value of Programmed Instruction as a Tool for the Enhancement of High School Distributive Education Student's Career Objectives" (Kalamazoo, Michigan: Western Michigan University, 1966).
the exception of the word knowledge test, identical measuring instruments were administered again after the experimental group had finished studying the programmed materials.

A fifty item instrument consisting of true false and multiple choice questions was used as the subject matter test. Both the control and experimental groups changed somewhat in a positive direction between the pretest and posttest scores. However, the intragroup *t*-tests showed no significant differences and the corresponding correlation coefficients indicated that the gains or differences of scores from pretest to posttests within each group were not statistically significant.

Ferguson compared the effectiveness of project and cooperative methods of teaching high school distributive education. Four groups of students in ten schools were compared on improvement of test scores in sales and economic understanding. Cooperative distributive education students, project distributive education students, students in social science classes, and students in English classes were compared through their scores on the STEP Reading, Form 2A, the Test of Economic Understanding, Forms A and B, the Test of Sales Aptitude, and the Sales Terms Test. Three statistical procedures were used in the analysis of the total data: (1) simple correlations, (2) *t*-tests and (3) analysis of covariance.

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The results of the statistical analysis indicated no significant differences between the project and cooperative students in their scores on the test of economic understanding, but a significant difference between the two groups of students in achievement on the test of sales comprehension.

The investigators also found that neither prior achievement, socio-economic status, student age, nor teacher attitude were of any significance in assessing the effect of each of the two methods of instruction as measured by the standardized test scores in economic understanding and sales comprehension.

The researcher concluded that the standardized tests utilized in the study, because of their generalized content, were not sufficiently sophisticated instruments to discriminate between the two groups, and therefore, the two methods of instruction. It was recommended that valid instruments be developed which effectively measure the outcomes expected for distributive education classes.

A comparison was made by Ashmun of the relative effectiveness of two different teaching methods in a lower division college business course. One group of students participated in a business game during a three week unit in the business course while a control group was taught by using a lecture-discussion-problem technique.

The content for the unit and the unit achievement test were determined jointly by the investigator and the instructors in the course. The specially constructed achievement test consisted of true-false, multiple choice and computational items. It was tried out on a pilot basis during the academic quarter preceding the quarter in which the study was conducted.

Reliability correlations were computed for the trial and an item analysis conducted prior to administration of the instrument. Items were revised or deleted on the basis of this analysis. One hundred and twenty items made up the instrument which was administered as a posttest only to the control and experimental groups after completion of the unit of instruction.

Student scores were classified according to: (1) the student and type of treatment, (2) the ability level of the student, and (3) whether the student was a freshman or a sophomore. This data was then used to perform one three-way analysis of variance to determine the amount of variance accounted for by the interaction effects.

Ashmun found no significant difference at the .05 level between the mean scores of students on the three week unit achievement test who had undergone the business game treatment and those students who had undergone the lecture-discussion-problem technique. There were no significant interactions among any combination of ability levels, class status and treatments at the .05 level.
Donald Beattie attempted to determine the relationships which might exist between the amount of correct information possessed by students and the direction of their attitude toward personal finance. He developed two instruments to assess the information possessed and attitude toward personal finance. A series of multiple choice test items on information for each of four areas of personal finance served as the measure of information possessed by eleventh and twelfth grade students in Minnesota schools during the school year 1960-61.

The information tests were constructed so that they might be used for one or more of the following purposes:

1. to evaluate a school's program of instruction in personal finance;
2. to measure student achievement at the end of a unit in personal finance;
3. to serve as a motivating device to introduce the study of personal finance.

The tests of information were drawn from the four areas of money management, credit, insurance, and savings and investments. Content validity was obtained for the instruments by drawing the information tested from an analysis of then current high school consumer education textbooks. In addition, items selected were submitted to nationally recognized experts to insure their assignment to the proper scale and to determine the "correct" answers for the information test. An attempt was also made to demonstrate

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44 Arthur Donald Beattie, "Relationships Between Pupil's Information and Attitudes Toward Personal Finance" (unpublished Ph.D. dissertation, the University of Minnesota, 1962).
construct validity, that neither instrument was measuring intelligence or reading comprehension, by correlating the scores on the information test and attitude test with scores on the Minnesota Scholastic Aptitude Test and available reading comprehension tests.

The preliminary forms of the instruments which he constructed were tried out on 480 students enrolled in twenty consumer education classes. Based upon item analysis, the instruments were then revised and administered to 506 students enrolled in an additional twenty-three consumer education classes in Minnesota secondary schools.

An analysis was made on the basis of mean scores on the consumer information tests with respect to the variables of sex, grade level, textbooks used, and socio-economic status.

The Pearson product-moment correlation coefficient was calculated to demonstrate construct validity by showing that the consumer information test was not a good measure of intelligence or reading comprehension. The correlation between the scores on the information test correlated .42 with scores on the Minnesota Scholastic Aptitude Test and .62, .61 and .52 with scores on three available reading comprehension tests.

The analysis of variance technique was utilized to determine the amount of variance in the students' scores accounted for by the variables being tested. Beattie concluded that there was little relationship between the amount of information possessed and the direction of one's attitude toward personal finance and that, in
addition, one should not expect to teach desirable attitudes toward personal finance on the basis of information alone.

Raymond A. Dannenberg attempted to determine whether reinforcement frequency affects the learning of a specific body of knowledge by groups of high school students in which the measurable difference is intelligence. He used an eighty item criterion test developed from the content of a program text which was considered the subject matter of the study. The criterion test was administered as a pretest, posttest and retention test taken after a time lapse of about three weeks following the posttest.

Scores on the criterion test were compared to each other and to scores achieved by these same students on the California Test of Mental Maturity and the California Achievement Test. The students were assigned to three groups based upon the type of reinforcement received during the experiment.

Dannenberg constructed a test consisting of one hundred true false and seventy-five multiple choice questions. He administered the test on a pilot basis to a group of twenty-nine high school juniors and seniors. On the basis of item analysis, the discriminating questions were selected and an eighty item test, half true false

45Raymond Arthur Dannenberg, "The Relationship of Intelligence to Reinforcement in a Linear Programmed Instruction Unit Dealing With the Free Enterprise System" (unpublished Ph.D. dissertation, the University of Michigan, 1965).
and half multiple choice was constructed. Over one hundred and eighty students completed the study and testing program. An analysis of variance was used as the test of significance of the difference between the criterion test scores and the intelligence and achievement scores classified by types of test and level of reinforcement. A further t-test was used when statistically significant differences existed.

Dannenberg concluded that the need for reinforcement is less among students with high levels of intelligence than it is for subjects of low levels of intelligence in learning and understanding a given body of knowledge.

Summary

Several writings of distributive educators were reviewed which state in broad terms the objectives of secondary distributive education. Numerous objectives are proposed, one of the most widely recommended being the knowledge or understanding objective. Little research was reviewed which isolates these objectives and attempts to evaluate them in terms of student outcomes. The recent research studies of Crawford and Ertel which were reviewed in this chapter are pioneer efforts in elaborating or justifying the objectives and content of distributive education.

Some distributive educators have evaluated specific trial programs, instructional materials, or experimental teaching methods through evaluation of student outcomes. In all the studies reviewed
in this chapter a subject matter achievement instrument was developed to test student outcomes.

Several distributive educators have utilized standardized instruments which were developed for evaluation of instructional objectives which distributive education shares with other subject matter disciplines. The researchers who used these instruments concluded that they were not adequate to measure the outcomes of distributive education.

Although examples of evaluative studies were reviewed which dealt with subject matter closely aligned with the main objectives of distributive education, only three were found and reviewed which attempted to measure widespread student accomplishment of the main objectives of distributive education.
CHAPTER III

DESIGN AND METHODOLOGY

The purposes of this study were to develop an instrument to measure the composite subject matter achievement of distributive education students and to assess and compare student achievement in two different types of distributive education programs in Ohio. In realization of the purposes of this study, the design of the investigation was subdivided into three distinct stages. The three stages were:

1. Identification of the objectives, instructional phases, and composite subject matter content of cooperative distributive education in Ohio.

2. Development of an instrument for assessing student accomplishment in composite subject matter common to distributive education.

3. Measurement of the achievement of distributive education students and comparison of the achievement of students from Plan B and Plan C programs in Ohio.

Determining objectives and instructional content

In planning to assess one phase of student achievement in distributive education, the first consideration was to determine the program objectives, instructional phases and composite subject matter. From an analysis of literature and published curriculum and instructional guides, a list of fourteen major topics were selected which
were most frequently recommended as part of the distributive education instructional program.

After the instructional objectives were tentatively identified, and the list of main instructional topics developed, the next step carried out was to review some of the textbooks and teaching materials currently used by distributive educators in order to identify the major knowledges and understandings common to marketing and distribution instruction. For this purpose, the teaching materials identified in APPENDIX D were analyzed. The indexes, tables of contents, and textual outlines were examined in order to further itemize the sub-topics within the broad instructional areas.

This tentative assemblage of instructional content was submitted in the form of a checklist to a stratified random sample of experienced Ohio Distributive Education coordinators for their opinions as to whether the topical areas identified were essential to the related instructional phase of the distributive program. In addition, these coordinators were asked to indicate their degree of agreement with the objectives upon which the instructional content was based. Finally, they indicated their degree of acceptance of composite subject matter instruction as an integral part of cooperative distributive education.

General agreement was obtained with the principle that the acquisition of certain knowledge appropriate to marketing and distributive occupations is an essential objective of the educational program and that these knowledges are usually taught in "composite subject
matter" classroom instruction as distinguished from on-the-job training, specialty subject matter instruction, and youth club activities. The content validity for the achievement instrument is based on this agreement among Ohio coordinators.

The ten instructional topics which were later developed from this first stage of the study are defined in Chapter I of this report. The instructional areas or topics are: Salesmanship, Sales Promotion and Advertising, Job Skills and Product Knowledge, Merchandising, Human Relations, Retail Mathematics, Economics of Distribution, Marketing, Job Knowledge and Job Adjustment, and Orientation to the Distributive Education Program.

Developing the instrument

Since the purpose of the instrument is to measure the extent to which students gain knowledge in the composite subject matter of distributive education, an objective achievement test was chosen for this study. The desirability of such an instrument is based upon the fact this type of test can effectively "help assess pupil's progress toward certain educational objectives."¹ It was also thought to be acceptable and familiar to the students and teachers who were involved in this study. Multiple choice items were chosen for the test because they can be scored objectively, are accurate in terms of measurement,

are generally very flexible, and are universally well known by both students and teachers.  

The common facts and understandings discovered through the review of distributive education instructional literature were the basis for writing the individual test items for this instrument. Since there is no standardized content for distributive education instruction from state to state or from school to school, the technique suggested by Arny for constructing a test which may be used in many schools was adopted.  

Arny reported that although there is no standardized course of study, there is fairly general agreement, perhaps more in some areas than in others, regarding the objectives toward which instruction should be directed and the content which should be included. Arny said that therefore it is possible to construct a grid for a test which may be used in many schools, just as one can for a test to be administered only to a single class in a particular school.

The present test grid was constructed in the manner described by Arny with the ten major instructional areas in distributive education apportioned to the number of questions to be asked in that subject matter area. The test was to have two forms, and accordingly each form contained approximately the same ratio of questions for each of the subject matter areas to the total number of times this area was

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recommended for inclusion in the ideal secondary cooperative distributive education program.

To obtain the advise of experts in distributive education on the rationale, point of view, and content of the instrument a group of educators reviewed the initial forms of the test. This group of experts included seven persons from the following categories: city supervisors, teacher educators, and state supervisors in distributive education. In addition, this group included a specialist in distributive education from the United States Office of Education, Department of Health, Education, and Welfare. These persons, along with their positions, are listed in APPENDIX E of this study. These persons were chosen for their leadership positions and their knowledge and involvement in distributive education instruction and research. They were asked to make an overall judgment on the justifications of the topics included in the test as valuable subject matter in distributive education and to check each item on both forms of the instrument for content and construction.

After changes, deletions, and modifications were completed as a result of the experts' evaluation, the instrument was administered to a number of distributive education seniors in a trial run prior to initial testing of the sample of Ohio students. This trial run provided an indication of what might be expected during the administration of the final forms in terms of time required to take the test, the clarity of directions, the ease with which the test could be taken, and anticipated difficulty levels.
The final corrected forms were then given as a pretest to a sample of Ohio distributive education students from Plan B and Plan C programs. This September pretest served to equate any differences between the two groups, and provided the base scores for determining gains in achievement for students in the two groups. This pretest was given at the beginning of the senior year and scores were analyzed (APPENDIX F, G) for purposes of comparison with later scores on the second or posttest. In addition, minor revisions were made in several pretest items as a result of this analysis.

Upon completion of the April posttest, scores were analyzed (APPENDIX H, I) for purposes of determining reliability, standard errors of measurement, the comparability of scores, and differences between the scores of students in the groups compared and between the pretest and posttest results. The posttest instruments are included in this report at APPENDIX J and APPENDIX K.

Measuring the composite subject matter achievement of Distributive Education students

The design which appeared most appropriate for the measurement aspect of the present study was the nonequivalent control group design described by Campbell and Stanley. This design is described as the most widespread design used in educational research in recent years.

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Utilizing this design, it was possible to control some of the variables which might otherwise jeopardize the validity of the experimental and comparative features of the present study.

The nonequivalent control group design involves an experimental and control group both of which are given a pretest and posttest, but in which the experimental group and the control group do not have pre-experimental sampling equivalence. Rather, the groups constitute naturally assembled collectives such as classrooms, as similar as availability permits, but yet not so similar that one can dispense with the pretest.\textsuperscript{5}

The comparative section of this study was concerned with the relationships of program length to achievement in related distributive education composite subject matter. According to the "Ohio State Plan for Vocational Education," the content of the several program types was at the outset and continues to be essentially the same.\textsuperscript{6} The two program plans which are compared in this study involve the same number of clock hours of related instruction. Since these two program plans also contain the same basic instructional guidelines, content and equivalent man-hours of instruction, they differ only in the duration of related instruction. The control group was made up of

\textsuperscript{5}Ibid.

\textsuperscript{6}"Ohio Plan for Distributive Education," \textit{op. cit.}
those students from programs identified as Plan B in this study.

This one year program with two hours per day of instruction on the senior level was considered "usual" for purposes of comparison. The experimental group was composed of students from those programs designated as Plan C in this study. The experimental condition of this aspect of the study was the lengthened program of instruction of Plan C programs. This longer program is carried out through a preparatory one hour per day of instruction on the junior level which the Plan B programs do not have. While the Plan B programs have two hours of related instruction on the senior level, Plan C programs have only one per day at this level.

Choice of students. In the school year 1966-67, there were one hundred and sixty-three high school distributive education programs in Ohio, in which approximately 5,600 students were enrolled. In the school year 1967-68, there were two hundred distributive education programs in Ohio, in which an estimated 6,600 secondary students were enrolled. The present study was concerned only with seniors in the two hundred secondary distributive education programs in Ohio.

Of the total number of programs in 1966-67 (163), a twenty-five percent stratified sample of programs with experienced coordinator-instructors was chosen at random from the four geographic supervisory regions in Ohio. Of one hundred and sixty-three programs taught by

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7"Distributive Education Program, 1966-67" (Columbus: Ohio State Department of Education, Division of Vocational Education, 1967). (Mimeographed.)
experienced coordinators in 1966-67, a sample of forty-one was drawn for determination of the scope, phases, objectives, and content of distributive education instruction in Ohio.

The coordinators from the sample of forty-one programs were asked by letter if they would cooperate in this achievement study. Of these forty-one persons, thirty-two (78%) completed the objectives, instructional phases, and instructional content questionnaire in May of 1967, and sixteen reviewed the achievement instrument developed later. Twenty-one of these thirty-two experienced coordinators participated in the achievement testing program.

At the beginning of the 1967-68 school year, there were sixty new coordinators in distributive education teaching positions in Ohio. In order to build this proportion into the final sample of schools that participated in the testing phase of the study, eight programs taught by coordinators new to distributive education were added to the sample. Twenty-nine programs, twenty-one with experienced coordinator-instructors and eight with coordinators new to distributive education, comprised the sample of distributive education programs in Ohio.

The sampling procedure used amounted to randomization of the classroom as a unit and although this technique did not sample students individually, it did have the advantage of convenience and it also reduced the effect of student reaction to the experiment.  

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8 Donald T. Campbell, and Julian C. Stanley, op. cit., p. 192.
However, the number of programs was large enough that the non-representative effect of this selection technique should have been reduced considerably.

**Administration of the achievement instrument.** To reduce the effect of outside confounding variables on student performance as much as possible, Campbell and Stanley's principles for internal and external control of the research design were applied to collecting the data for this study.⁹

The results of maturation and history were thought to be minimized because all participants would have been subjected to the same general historical events and the same rate and degree of maturation during the testing period. The students were of the same general age and had been enrolled in the same type of secondary program prior to and concurrent with their enrollment in distributive education.

The first test was given to all groups during the same two week period in September and the final or posttest during the same two week period in April. Therefore, there was no more than ten teaching days' difference in the date in which all persons completed the pre and post examination. No particular school would have had a significant advantage over the others because of having had more instructional time.

As related earlier, classes were selected at random by school unit for the two types of programs being compared. These programs were chosen according to the ratio which they bore to the total distributive education programs in the state. In this way the students were thought to be fairly representative of the total state population of distributive education students in these two types of programs. In addition, the two types of programs represented were the only two types of cooperative distributive education programs in operation in Ohio in the school year 1967-68.

To lessen the adverse effect of differences in testing procedure, it was decided to establish a standardized procedure for administering the test. The procedure adopted was to:

1. Have the tests, direction sheets, answer sheets and pencils on the desk of each student prior to the beginning of the testing period.

2. Carefully explain the purpose and procedure of this testing program.

3. Read over with the students the directions for taking the test, answering any questions they might have about it.

4. Administer the test. Timing limited to a minimum of forty and a maximum of sixty minutes.

5. Collect the tests at the end of the testing period.

The eight month period between the pretest in September and the posttest in April was considered adequate to practically eliminate the effect of the teaching power of the first or pretest in preparing students to take the second test. Using one form on the first test and the other form on the second test would also have had the
result of reducing or almost eliminating the ability of students to "learn the test."

As an attempt to minimize the effect of experimentation on the performance of the students, the importance of the typical class atmosphere was stressed to the coordinator-instructor who cooperated in the study.

**Analysis of data**

Test reliability was determined through computation of the Kuder-Richardson Formula 20, the Kuder-Richardson Formula 21, and the split half method. An item analysis was completed by form of test and type of program for both the pretest and posttest. The difficulty level, discrimination index, phi-coefficient, and point biserial correlation coefficient was computed for each item on both forms of the test. The formulas utilized in this study are presented in APPENDIX L.

Pretest and posttest scores were compared for all the students who completed both tests. Scores were compared through computation of the standard error of the difference between the means of the pretest and posttest and then comparing the difference between the means to the standard error of the difference through z ratios. The pretest and posttest scores of the students who scored in the upper and lower twenty-seven and one half percent of the pretest range were compared and the comparison presented in Chapter IV.
The mean difficulty levels of the two forms of the test were computed for each of the ten instructional areas and nine instructional objectives incorporated into the instruments. The mean difficulty levels of these sub-tests were compared through t-tests by form of test and type of program for pretest and posttest scores.

The scores of ninety-five students from three Plan B programs and three Plan C programs on both Form 1 and Form 2 of the achievement test were compared by means of the Spearman Rank Correlation Coefficient between their rank on the achievement test and their rank in their respective senior classes. In addition, the student scores on the distributive education achievement test from one school were compared to their scores on an intelligence test to determine if the achievement test measures the learning of content appropriate to distributive education instead of intelligence as measured by one intelligence test.
CHAPTER IV

SUMMARY OF FINDINGS

Determination of program objectives

The framework upon which this study is built and the end to which the effort is directed was determined by the distributive education objectives identified earlier in this paper. The secondary distributive education objectives identified from the review of the literature were:

1. To prepare students in the skills, technical knowledges, occupational information, understanding, social ability, morale, appreciation, and judgment needed for initial or entry employment in marketing and distributive occupations.

2. To prepare students as distributive workers in their distributive careers for later job transfer and job advancement.

Distributive education objectives are concerned with the cognitive, affective and psychomotor domains. Each statement of objectives reviewed in this study included one of the concepts of knowledge, understanding, or mastery of information. The knowledge category of the cognitive domain was chosen as the most universally accepted objective of secondary distributive education and the most appropriate for the measurement purposes of this study.
In order to test the validity of the knowledge objective for Ohio distributive education programs and to determine the part of the cooperative program wherein this objective is achieved, a sample of distributive education coordinator-instructors in Ohio was questioned concerning the objectives, program phases and instructional content in secondary cooperative education.

At the time this step in the study was completed (May, 1967), there were one hundred and sixty-three coordinators employed in approved Ohio secondary cooperative distributive education programs. These coordinators were sampled according to the pattern as presented in Illustration 1. The state of Ohio is divided into four areas for supervisory and administrative purposes by the Distributive Education Service of the State Department of Education. The total number of coordinators in each of the four areas in the school year 1966-67 was: Area I, forty-four; Area II, forty-one; Area III, fifty-one; and Area IV, twenty-nine. A twenty-five percent sample (N=41) was drawn from this population and each questioned by mail about the possibility of cooperating in the study. Thirty-two (78%) of those coordinators sampled agreed to participate in the first step in this study.

Prior to submission of the appraisal questionnaire to the sample of Ohio coordinators, it was reviewed on a trial basis by eight distributive educators and by the State Supervisor of Distributive Education in Ohio. These nine persons reviewed, analyzed, and evaluated the form and offered suggestions for its improvement.
The names and school addresses of these persons are included in this report as APPENDIX A. The suggestions obtained from this group of personnel as well as those from the Ohio State Supervisor of Distributive Education were incorporated into the instrument through appropriate definitions, revisions, and clarifications.

The instrument, after review, was mailed to the sample of coordinators identified above. These thirty-two educators completed the objectives, phases and content instrument which is included as APPENDIX B in this report. In addition, a portion of this sample agreed to (1) react later to the instrument developed to assess student achievement in one phase of instruction, and (2) to participate in the testing program.

Because of the sampling involved, the teaching experience and educational background of the coordinators was obtained from an information section of the appraisal instrument. Twenty-five of the respondents had earned baccalaureate degrees, and six respondents had earned graduate degrees as the highest degree obtained at the time of their participation. One coordinator did not complete the information section of the appraisal instrument.

Of the twenty-five undergraduate degrees represented, five were in distributive education. Six of the degrees were in business, five of which were in marketing and one in business administration. Four of the coordinators had earned two degrees on the baccalaureate level. Three of the six advanced degrees were in education, two in business, and one in social science. Five of the graduate degrees
Figure 1

Sampling of Ohio Coordinators For Study of the Objectives, Content, and Instructional Phases of Distributive Education

Area II
41 Coordinators
10 Sample
9 Respondents

Area III
51 Coordinators
13 Sample
7 Respondents

Area I
44 Coordinators
11 Sample
8 Respondents

Area IV
29 Coordinators
7 Sample
7 Respondents
were Master's, and one was the Specialist in Education degree. Thirteen of the coordinators stated they were working toward Master's degrees, four of which degrees were planned in distributive education.

The mean number of years of teaching experience for the thirty-two coordinators was five, and the mean number of years spent as distributive educators was four and four tenths. The distributive education programs in which these persons taught had been in operation for an average of six years.

These coordinators indicated their agreement or lack of agreement with a set of five objectives of cooperative distributive education on the secondary level, and to four statements concerning the main phases or sections of the cooperative program. All statements were created through an extensive review of literature. These statements were given on the instrument and were followed by a five point scale upon which each of the coordinators indicated his level of agreement with the statements as presented. This section of the instrument is included as APPENDIX C of this report.

Of prime importance was the coordinator's opinion concerning the main objective of distributive education on the secondary level. All other objectives and activities of distributive education on the secondary level are based upon acceptance of this main objective. Their agreement with the main objective as stated is presented in TABLE I.
TABLE 1

AGREEMENT OF OHIO COORDINATORS SAMPLED WITH THE MAIN OBJECTIVE OF DISTRIBUTIVE EDUCATION AS STATED

1. The main objective of distributive education in the high school is to prepare students for jobs in distribution and marketing.

<table>
<thead>
<tr>
<th></th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.</td>
<td>11</td>
<td>19</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>%</td>
<td>34</td>
<td>59</td>
<td>3</td>
<td>3</td>
<td>0</td>
</tr>
</tbody>
</table>

Thirty of the thirty-two coordinators (94%) agreed with this statement of the main objective of distributive education on the secondary level. The Kolmogorov-Smirnov one-sample test was used to determine the degree of similarity between the distribution of the responses made by the distributive educators and a theoretical equal distribution of responses among the five options.¹

In comparing the actual distribution of responses with the theoretical equal chance distribution of responses among the five options, one can determine the probability that such a spread obtained might have actually been the result of chance.

In terms of the responses obtained to the main objective of distributive education, a spread of responses such as was obtained would have had the probability of occurring as a result of chance only once in one thousand times. Since the difference is in terms of agreement with the statement, it can be reasonably stated that there was significant agreement among the coordinators with the objective as stated.

The distribution of responses among the coordinators sampled on each of the four instructional objectives of distributive education is summarized in TABLE 2.

Using the Kolmorogrov-Smirnov test as described above, it was determined that each of these distributions of responses would have happened by chance alone less than once in one thousand times when compared to an equal distribution of responses among the five options. There appears to have been overwhelming agreement among this sample of educators with the objectives as stated.

In the space on the appraisal instrument for additions or comments, three separate persons suggested that the instructional objectives 2, 3, 4, 5 above, might just as well apply to occupations other than those of marketing and distribution since these characteristics or traits developed through achievement of the objectives as stated would be valuable in many occupations. These suggestions were not considered to be invalidators of the responses of the persons who made the suggestions. Only two other separate and
TABLE 2
AGREEMENT OF OHIO COORDINATORS SAMPLED WITH THE INSTRUCTIONAL OBJECTIVES OF DISTRIBUTIVE EDUCATION AS STATED

In carrying out this main objective, it is necessary for distributive education students to learn and acquire:

<table>
<thead>
<tr>
<th>Instructional Objective as Stated</th>
<th>No. and %</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Intellectual abilities and knowledges appropriate to marketing and distributive occupations.</td>
<td>No. 14 % 44</td>
<td>18</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>3. Manipulative or motor skills appropriate to marketing and distributive occupations.</td>
<td>No. 8 % 25</td>
<td>23</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>4. Interests, values, and attitudes appropriate to marketing and distributive occupations.</td>
<td>No. 22 % 69</td>
<td>10</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>5. Appreciations and adjustments appropriate to marketing and distributive occupations.</td>
<td>No. 15 % 47</td>
<td>13</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>
unrelated suggestions were made by the coordinators in the "write-in" section of the instrument.

The educators indicated their agreement with four phases or sections of cooperative education as they were presented in the instrument and wrote in any additional phases or sections they felt should be added to the four presented. Their responses are presented in TABLE 3. No additional phases or sections of the cooperative program were suggested by the coordinators who responded.

Using the Kolmogorov-Smirnov one-sample test of the goodness of fit, it was found that the distribution of each of the responses on these four statements of instructional phases differed from the theoretical equal distribution of responses at the .001 level of significance. Only one person indicated disagreement with any statement, that in phase B, the 'composite subject matter' phase of vocational classroom instruction. This summary indicated a very high level of agreement among the respondents with the phases or aspects of the program as stated in the instrument.

**Determination of composite subject matter content**

The next part of the appraisal instrument was delimited to those areas of instruction to be learned by distributive education students as portions of the knowledges applicable to all distributive occupations. The coordinators indicated whether they thought each of the topics listed under fourteen major areas of instruction should be included as part of the 'composite subject matter' instruction in
TABLE 3
AGREEMENT OF O HIO COORDINATORS SAMPLED
WITH THE INSTRUCTIONAL PHASES OF
DISTRIBUTIVE EDUCATION AS STATED

<table>
<thead>
<tr>
<th>Instructional Phases as Stated</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. On-the-job training</td>
<td>17</td>
<td>15</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>%</td>
<td>53</td>
<td>47</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>B. Instruction in those areas or topics common to all marketing and distributive occupations.</td>
<td>18</td>
<td>13</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>%</td>
<td>56</td>
<td>41</td>
<td>0</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>C. Instruction in those areas or topics applicable to the training stations and the type of job in which the cooperative student is placed.</td>
<td>13</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>%</td>
<td>41</td>
<td>59</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>D. Instruction and participation in the personal, social, and leadership activities of youth programs.</td>
<td>12</td>
<td>15</td>
<td>5</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>%</td>
<td>38</td>
<td>47</td>
<td>15</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

distributive education. These knowledge areas or topics were drawn from the textbooks widely used in high school distributive education instruction. These textbook and curriculum guide sources of composite subject matter content are listed in APPENDIX D of this report.
The thirty-two coordinators who responded had one of three choices in this portion of the instrument:

1. This topic should be taught to high school students as part of the knowledge applicable to marketing and distributive occupations.

2. I am not sure this topic should be taught to high school students as part of the knowledge applicable to marketing and distributive occupations.

3. This topic should not be taught to high school students as part of the knowledge applicable to marketing and distributive occupations.

This section of the appraisal instrument, along with the tally of responses is included in APPENDIX C. The major knowledge areas and sub-topics selected as the subject matter of the achievement instrument were those upon which there was almost complete agreement that they should be taught as part of the subject matter applicable to marketing and distributive occupations. No attempt was made to determine any justification for inclusion or rejection of the knowledge areas and topics, but to obtain a list of commonly accepted composite subject matter knowledge topics for Ohio distributive education classroom instruction.

The final summary of the composite subject matter instructional content is outlined below. The areas and topics are those upon which there was almost complete agreement among the coordinators that they should be taught in secondary cooperative distributive education. The areas and topics are preceded by the percent of the respondents who (1) accepted each knowledge area or topic, (2) were
unsure, or (3) thought the area or topic should not be included in
distributive education instruction. Those areas upon which there
was not a high level of acceptance are not included in the summary.
The summary of highly acceptable areas is presented in TABLE 4.

TABLE 4

<table>
<thead>
<tr>
<th>Composite Subject Matter Instructional Areas</th>
<th>Should be Taught</th>
<th>Unsure</th>
<th>Should not be Taught</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SALESMAINSHP:</strong> Knowledge of The kinds and value of selling.</td>
<td>96</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Sales occupations.</td>
<td>96</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Steps in the sales process.</td>
<td>96</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Suggestion selling.</td>
<td>100</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>The modern concept of selling.</td>
<td>96</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td><strong>JOB SKILLS AND PRODUCT KNOWLEDGE:</strong> Knowledge of Common job skills.</td>
<td>96</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>General practices common to broad store types.</td>
<td>93</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>Importance of product information.</td>
<td>100</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Sources of product information.</td>
<td>93</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td><strong>SALES PROMOTION AND ADVERTISING:</strong> Knowledge of Function and value of sales promotion and advertising.</td>
<td>96</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Composite Subject Matter Instructional Areas</td>
<td>Should be Taught</td>
<td>Unsure</td>
<td>Should not be Taught</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------------</td>
<td>------------------</td>
<td>-------</td>
<td>----------------------</td>
</tr>
<tr>
<td>Relation of sales promotion and advertising to sales and profit.</td>
<td>96</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Types of sales promotion and advertising.</td>
<td>90</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Principles of advertising.</td>
<td>100</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Store advertising and display.</td>
<td>96</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Mechanics of advertising.</td>
<td>93</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Advertising media.</td>
<td>100</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>MERCHANDISING: Knowledge of</td>
<td>96</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Store location and layout.</td>
<td>100</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Buying.</td>
<td>93</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>Store systems.</td>
<td>96</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Pricing.</td>
<td>96</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Inventory and inventory control.</td>
<td>93</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>Customer services.</td>
<td>96</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Function and Value of Customer services.</td>
<td>96</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Kinds of services.</td>
<td>100</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>HUMAN RELATIONS: Knowledge of</td>
<td>100</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Effective communication.</td>
<td>96</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Establishing and maintaining good relations with customers and fellow workers.</td>
<td>100</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Cooperation and joint effort.</td>
<td>93</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>RETAIL MATHEMATICS: Knowledge of</td>
<td>100</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Basic mathematical computations.</td>
<td>93</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>Basic computations useful in marketing, e.g., making change, computing discounts, etc.</td>
<td>100</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>ECONOMICS OF DISTRIBUTION: Knowledge of</td>
<td>100</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Nature of our economic system.</td>
<td>100</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Composite Subject Matter Instructional Areas</td>
<td>Should be Taught</td>
<td>Unsure</td>
<td>Should not be Taught</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>------------------</td>
<td>--------</td>
<td>---------------------</td>
</tr>
<tr>
<td>Role and relationship of marketing and distribution.</td>
<td>93</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>Special functions of our system which affect marketing.</td>
<td>87</td>
<td>13</td>
<td>0</td>
</tr>
<tr>
<td>JOB KNOWLEDGE AND ADJUSTMENT: Knowledge of</td>
<td>96</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Requirements and practices of marketing and retailing occupations.</td>
<td>90</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Characteristics of successful workers.</td>
<td>96</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Choosing and planning a career.</td>
<td>96</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>The job etiquette.</td>
<td>96</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>The nature of habits, traits, character.</td>
<td>90</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Entry jobs and job advancement.</td>
<td>87</td>
<td>13</td>
<td>0</td>
</tr>
<tr>
<td>Application of job analysis techniques.</td>
<td>90</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>MARKETING: Knowledge of</td>
<td>100</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Size and importance of marketing in our economy.</td>
<td>96</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Types and functions of marketing institutions.</td>
<td>96</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Functions and relationships of the phases of marketing.</td>
<td>90</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>Legal regulation and control.</td>
<td>93</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>Consumer protection.</td>
<td>93</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>ORIENTATION TO THE DISTRIBUTIVE EDUCATION PROGRAM: Knowledge of</td>
<td>93</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>Purposes and operation of the program.</td>
<td>100</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Rights and responsibilities of students, teachers, and employers.</td>
<td>100</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Youth club program.</td>
<td>96</td>
<td>4</td>
<td>0</td>
</tr>
</tbody>
</table>
Construction of the achievement instrument

Two hundred and thirty multiple choice questions were written to sample the representative knowledge drawn from the ten instructional areas identified above. The number of questions in each of the ten instructional areas on the achievement instruments was roughly proportionate to the number of times each area was included in suggested distributive education curriculums.

These test questions were assigned at random by instructional area to two forms of the same instrument. These forms were designated as Form 1 and Form 2.

The two forms were first sent to seven distributive educators recognized for their capabilities in research, instruction, curriculum construction, and evaluation. The names, professional positions, and locations of these educators are presented in APPENDIX E. These educators did three things:

1. They presented their opinion concerning the desirability of a pretest, posttest design for assessing student achievement in distributive education.

2. They reviewed the two forms of the instrument in terms of coverage and suitability and evaluated each item in terms of its appropriateness to distributive education classroom instruction.

3. They eliminated, corrected, or made recommendations for correction of each of the test items.

The seven respondents agreed that the pretest posttest design in achievement testing is well suited to distributive education and an excellent technique for measurement of certain aspects of student
learning. There were, however, several cautions suggested by these educators:

1. The assessment of achievement in distributive education is dependent upon the degree to which the measurement instrument is based upon the objectives of distributive education.

2. Such an achievement instrument must be precise in its measurement of vocational outcomes.

3. Two persons stated that the value of the instrument would rest upon its occupational validity, and in this connection, they recommended that the instrument be reviewed by persons judged successful in marketing and distributive occupations. (It will be noted, however, that for purposes of this study content validity rests upon what is actually taught, and a step such as the one proposes is beyond the scope and intent of the present study).

From this preliminary instrument evaluation, two hundred items were selected and revised according to the suggestions made by the seven educators. The final content of the two forms of the instrument retained the original balance and proportion to the ten instructional areas agreed upon by the Ohio coordinators. The number of items in each subject matter area is presented for each of the two forms in TABLE 5.

The items on each form were written to correspond to the specific knowledge objectives as identified earlier from the work of Bloom. The items on each form of the test, as well as the subdivisions of the knowledge objective with which each item is identified are totaled below in TABLE 5.

\(^2\)Bloom et al., loc. cit., p. 79.
### TABLE 5

CONTENT OF THE ACHIEVEMENT INSTRUMENTS BY FORM OF TEST AND COMPOSITE SUBJECT MATTER AREA

<table>
<thead>
<tr>
<th>Composite Subject Matter Area</th>
<th>Number of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Form 1</td>
</tr>
<tr>
<td>I. Salesmanship</td>
<td>14</td>
</tr>
<tr>
<td>II. Sales Promotion and Advertising</td>
<td>13</td>
</tr>
<tr>
<td>III. Job Skills and Product Knowledge</td>
<td>12</td>
</tr>
<tr>
<td>IV. Merchandising</td>
<td>11</td>
</tr>
<tr>
<td>V. Human Relations</td>
<td>10</td>
</tr>
<tr>
<td>VI. Retail Mathematics</td>
<td>10</td>
</tr>
<tr>
<td>VII. Economics of Distribution</td>
<td>9</td>
</tr>
<tr>
<td>VIII. Job Knowledge and Job Adjustment</td>
<td>8</td>
</tr>
<tr>
<td>IX. Marketing</td>
<td>7</td>
</tr>
<tr>
<td>X. Orientation to D. E.</td>
<td>6</td>
</tr>
</tbody>
</table>

1.00 Knowledge Objective

<table>
<thead>
<tr>
<th>Posttest Item Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form 1</td>
</tr>
</tbody>
</table>

1.10 Knowledge of Specifics

<table>
<thead>
<tr>
<th>Knowledge of Terminology, Knowledge of the referants for specific verbal and non-verbal symbols.</th>
</tr>
</thead>
<tbody>
<tr>
<td>14, 26, 42, 43, 45, 47, 48, 50, 51, 63, 81, 97, 98, 100</td>
</tr>
</tbody>
</table>

1.12 Knowledge of Specific Facts, Knowledge of dates, events, persons, places, sources of information, etc.

<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5, 8, 17, 27, 32, 41, 44, 62, 69, 78, 89, 93</td>
</tr>
</tbody>
</table>
1.20 Knowledge of Ways and Means of Dealing With Specifics.

1.21 Knowledge of Conventions. Knowledge of the characteristic ways of treating and presenting ideas and phenomena.

1.22 Knowledge of Trends and Sequences.

1.23 Knowledge of Classifications and Categories. Knowledge of the classes, sets, divisions, and arrangements which are regarded as fundamental or useful for a given subject, field, purpose, argument, or problem.

1.24 Knowledge of Criteria. Knowledge of the criteria by which facts, principles, opinions, and conduct are tested and judged.

1.25 Knowledge of Methodology. Knowledge of the methods of inquiry, techniques, and procedures employed in a particular field as well as those employed in investigating particular problems or phenomena.
Posttest Item Numbers

<table>
<thead>
<tr>
<th>Form 1</th>
<th>Form 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.30 Knowledge of Universals.</td>
<td>7, 10, 12, 20</td>
</tr>
<tr>
<td>1.31 Knowledge of Principles and Generalizations.</td>
<td>25, 31, 61, 75, 50, 57, 59, 80, 85, 87, 88</td>
</tr>
<tr>
<td>Knowledge of particular abstractions which summarize observations of phenomena.</td>
<td></td>
</tr>
<tr>
<td>1.32 Knowledge of Theories and Structures.</td>
<td>2, 13, 16, 19, 15, 46, 51, 52, 53, 56, 75, 76</td>
</tr>
<tr>
<td>Knowledge of the body 58, 79, 96, of principles and generalizations together with their interrelations which present a clear, rounded, and systematic view of a complex phenomena, problem, or field.</td>
<td></td>
</tr>
</tbody>
</table>

Review of the instrument by Ohio coordinators

Each of the original respondents to the objectives, phases, and content instrument was asked to participate in phases two and three of this study. Phase two involved a review of the achievement instrument after its completion. Phase three involved participation in the testing program. Sixteen of the thirty-two coordinators who were sampled for phase one reviewed and evaluated both forms of the achievement instrument. Twenty-one of the original sample plus eight new coordinators administered the achievement instrument to their students in phase three of the instrument development portion of this study. The sixteen coordinators who evaluated the test completed the following steps in their evaluation:

1. They examined each of the questions on both forms of the test and wrote those corrections or recommendations
directly on the test which were thought to improve the test in terms of:
   a. the clarity of language;
   b. the existence of undue complexity or difficulty;
   c. the presence of only one best answer;
   d. the existence of inaccuracies or grammatical errors.

2. Next, they eliminated those questions which they decided did not belong in an examination over the composite subject matter knowledge of distributive education.

3. Finally, they made suggestions for improvement of items which were judged inferior or inappropriate.

The suggestions obtained in this manner were carefully analyzed and modifications based upon these suggestions were incorporated into the achievement instruments prior to the initial trial administration to a group of Ohio D. E. students during the 1966-67 school year.

**Trial administration of achievement instruments**

In order to determine the usability of the tests and to answer certain questions about the length and difficulty levels of the instruments, a trial administration was carried out at four Ohio distributive education programs (APPENDIX A) during the week of May 17-24, 1967.

The two forms were alternated among sixty-four senior students in four secondary schools so that one half of the students in each class completed Form 1 and the other half completed Form 2.

The investigator served as tester in each of the schools to determine the ease with which the tests could be administered and to keep in touch with any problems encountered in the testing program. Every one of the sixty-four students completed all of the one hundred
items on the test in less than fifty minutes. This time was judged satisfactory since class periods in most Ohio schools average between forty and sixty minutes in length. It was felt that students from different schools would be able to complete the tests during their regular class periods.

The scores on Form 1 ranged from 54 to 93 with a mean score of 75 and a standard deviation of 11.3. The mean score of Form 2 was 72 with a standard deviation of 10.0 and a range of scores 40-89. Scores were the number of items correct. Form 2 appeared to be the more difficult of the two, but the difference was not significant at the .05 level of chi-square when the distributions were compared through the Kolmogorov-Smirnov two-sample test of the goodness of fit. No significant difference in the means was found in the scores on the two forms of the instrument at the .05 level of t with sixty-one degrees of freedom.

It was decided on the basis of the trial that the two forms of the instrument were comparable, easily administered, and could be completed in the average class period. The difficulty level of the two forms was judged high, however, and several items were rewritten in an effort to increase the difficulty and reduce the mean scores of both instruments.

The pretest

From the original sample of Ohio coordinators chosen at random to participate in this study, thirty-two (78%) completed the review
of objectives, instructional phases, and content instrument; sixteen evaluated the achievement instrument; twenty-one cooperated by testing their students at the beginning and end of the school year.

In order to obtain a cross section of programs in proportion to the ratio of experienced coordinators to new coordinators, a sample was drawn from Ohio high schools which employed coordinators who had not taught distributive education prior to the 1967-68 school year. Three new coordinators from each of the four geographic regions in Ohio were asked by mail to participate in the testing phase of this study. Of these twelve invited, eight (75%) were added to the original sample and participated in the testing phase. The cross section of experienced and inexperienced coordinators of distributive education programs is represented in Figure 2. There were twenty-one programs coordinated by experienced teachers and eight programs coordinated by new teachers in the final sample. There was a total of seventeen Plan B and twelve Plan C programs.

Although the number of Plan B programs exceeded the number of Plan C programs, the number of senior students participating in the pretest in each type of program was more nearly equal.

In order to further test the comparability of the two forms of the achievement instrument, these students were subdivided again so that approximately one-half of the senior students in each type of program was tested with one form of the instrument and the other part tested with the alternate form. The number of students assigned to each of the forms is presented in TABLE 6.
Figure 2
Cross Section, by Experience, of Ohio Secondary Program Coordinators who Participated in the Testing Program During the 1967-68 School Year

Area II
49 Programs
Sample
6 Experienced
2 New Coordinators

Area III
52 Programs
Sample
7 Experienced
2 New Coordinators

Area I
55 Programs
Sample
4 Experienced
1 New Coordinators

Area IV
32 Programs
Sample
4 Experienced
3 New Coordinators
Figure 3
Cross Section of Participating Ohio D.E. Programs According to Type of Program, 1967-68

Area II
49 Programs
Sample:
5 Plan B Programs
3 Plan C Programs

Area III
52 Programs
Sample:
4 Plan B Programs
5 Plan C Programs

Area I
55 Programs
Sample:
4 Plan B Programs
1 Plan C Program

Area IV
32 Programs
Sample:
4 Plan B Programs
3 Plan C Programs
TABLE 6
OHIO COOPERATIVE STUDENTS WHO COMPLETED THE PRETEST BY FORM OF TEST AND TYPE OF PROGRAM

<table>
<thead>
<tr>
<th>Form of Test</th>
<th>Type of Program</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Plan B</td>
<td>Plan C</td>
</tr>
<tr>
<td>Form 1</td>
<td>113</td>
<td>151</td>
</tr>
<tr>
<td>Form 2</td>
<td>140</td>
<td>116</td>
</tr>
<tr>
<td>Total 1 and 2</td>
<td>253</td>
<td>267</td>
</tr>
</tbody>
</table>

The unequal numbers in any one group can be attributed to the fact that the type of program was the basic determinant of assignment to a particular test group. The number of students in each program, being unequal among the separate programs, was understandably unequal in the final total. The Plan B programs averaged fifteen senior students per program and the Plan C programs averaged twenty-one senior students each.

Student and employment characteristics. Of the total number of senior students involved in the pretest, approximately forty-six percent were male and fifty-four percent female. The mean age for the students from both types of programs was 17.1 years. There was no significant difference at the .05 level of t between the sex or mean age of Plan B students as compared to Plan C students.
In an effort to determine how typical the cooperative employment of these students was as compared to most Ohio distributive education high school student-trainees, the name and type of business of their cooperative employers was collected. Information was obtained about the employment of three hundred and sixty-five students who were tested in this study. Ninety-nine of the students did not provide employment information about themselves.

At the time of the pretest, the second week of school, six percent of those who supplied the employment information stated they were unemployed. At the time of the posttest, two percent stated that they were unemployed.

Ninety-five percent of the students stated that they were initially employed in retail firms, five percent were initially employed in wholesale and service occupations. Of the retail firms, department stores (30%), grocery supermarkets (22%), variety stores (7%), restaurants (7%), and service stations (5%) provided the original placement for about seventy-one percent of the students employed in retail businesses. These results are supported by the findings of Green in his study of Ohio distributive education, except that department stores accounted for about 30% of the retail placement of the students sampled in the present study, compared to about 20% of the student employment at the time of Green's study.\(^3\)

\(^3\)Green, op. cit., p. 3.
of the students were employed in retail firms according to Green's findings, whereas ninety-five percent of the students who were employed two weeks after the start of the program in 1967-68 were employed in retail firms. There is also a slight difference between the two studies in the proportion of persons employed in supermarkets and variety stores.

Something which did not appear in the Green study, but which was discovered in the present research, was the high proportion of students that had more than one employer as part of their employment experiences during the period between the pretest and the posttest. Ninety-one of three hundred and sixty-five students (25%) had more than one employer during the testing period. Approximately eight percent of three hundred and sixty-five students had three or more employers during their cooperative experience.

Pretest results. The pretests were machine scored from the "IBM Form I.T.S. 1000B 108" answer sheet, and the posttests were scored from the Optical Scanning Corporation's "DS 1120-C" answer sheet at the Orientation and Testing Center, The Ohio State University. The item analysis was completed through the use of facilities at the Computer Center, The Ohio State University.

Six separate testing groups were utilized in analyzing and comparing the test scores. The mean, median, and standard deviation of the pretest scores for the six comparison groups are presented in TABLE 7.
TABLE 7
PRETEST SCORE CHARACTERISTICS BY FORM OF TEST AND TYPE OF PROGRAM

<table>
<thead>
<tr>
<th>Comparison Groups</th>
<th>Median Score</th>
<th>Mean Score</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Form 1</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plan B Students (N = 113)</td>
<td>61.00</td>
<td>60.99</td>
<td>11.87</td>
</tr>
<tr>
<td>Plan C Students (N = 151)</td>
<td>60.81</td>
<td>60.48</td>
<td>9.89</td>
</tr>
<tr>
<td>Total B and C (N = 264)</td>
<td>60.73</td>
<td>60.78</td>
<td>10.93</td>
</tr>
<tr>
<td><strong>Form 2</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plan B Students (N = 140)</td>
<td>57.25</td>
<td>56.98</td>
<td>10.47</td>
</tr>
<tr>
<td>Plan C Students (N = 116)</td>
<td>57.00</td>
<td>54.43</td>
<td>14.93</td>
</tr>
<tr>
<td>Total B and C (N = 256)</td>
<td>56.83</td>
<td>55.96</td>
<td>12.88</td>
</tr>
</tbody>
</table>

In comparing the scores of students from the two differing programs on the two forms of the test, two methods were utilized. The first was the Kolmogorov-Smirnov two sample test of the goodness of fit between the distributions of the students scores. The second was the \( z \) ratio of the mean difference divided by the standard error of the difference between the means of the groups compared.

In testing the goodness of fit, the student scores were distributed according to frequency into percentage bands by type of program for each of the two forms of the achievement instrument. The distributions of student scores on both forms of the instrument are presented in TABLE 8.

After converting these percents into cumulative percents and then into the chi-square statistic, it was found that no significant
TABLE 8
PERCENTAGE DISTRIBUTIONS OF PRETEST SCORES
BY FORM OF TEST AND TYPE OF PROGRAM

| Comparison Group | Form 1 | | | | | | | | Form 2 | | | | | | | | | | | | | | Totals | | | | | | | | 21-29 | 29-36 | 37-44 | 45-52 | 53-60 | 61-68 | 69-76 | 77-84 | 85-92 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Plan B Students | 1 | 3 | 3 | 13 | 29 | 25 | 20 | 3 | 3 |
| Plan C Students | 1 | 0 | 5 | 17 | 26 | 25 | 24 | 5 | 0 |
| Form B Students | 0 | 3 | 13 | 24 | 21 | 26 | 9 | 4 | 0 |
| Form C Students | 10 | 5 | 9 | 14 | 19 | 29 | 10 | 4 | 0 |
| Form 1, B & C | 1 | 1 | 4 | 14 | 28 | 26 | 19 | 5 | 1 |
| Form 2, B & C | 5 | 3 | 10 | 18 | 22 | 28 | 10 | 5 | 0 |

difference existed between the distribution of scores of the two student groups on Form 1 or Form 2 at the .05 level of chi-square.

The distribution of scores achieved by students from both types of programs was compared for both forms of the instrument. It can be noted that scores on Form 2 are more frequently found in the lower bands than are those on Form 1. The chi-square statistic points out this difference in distribution. In converting the
difference to chi-square, this difference in distribution was significant at the .05 level.

This difference in score distributions between the two forms was borne out through the use of the $z$ test in determining the significance of the differences between the means of the six comparison groups. These computations are summarized in TABLE 9.

**TABLE 9**

**COMPARISON OF PRETEST MEAN SCORES BY FORM OF TEST AND TYPE OF PROGRAM**

<table>
<thead>
<tr>
<th>Comparison Group</th>
<th>$D_X$</th>
<th>$S_{DX}$</th>
<th>$z$</th>
<th>Significant at .05 Level?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form 1 Plan B with Plan C</td>
<td>.41</td>
<td>1.46</td>
<td>.35</td>
<td>No</td>
</tr>
<tr>
<td>Form 2 Plan B with Plan C</td>
<td>2.55</td>
<td>1.64</td>
<td>1.55</td>
<td>No</td>
</tr>
<tr>
<td>Plan B Form 1 with Form 2</td>
<td>4.01</td>
<td>1.50</td>
<td>2.67</td>
<td>Yes</td>
</tr>
<tr>
<td>Plan C Form 1 with Form 2</td>
<td>6.05</td>
<td>1.61</td>
<td>3.76</td>
<td>Yes</td>
</tr>
<tr>
<td>Total B and C Form 1 with Form 2</td>
<td>4.82</td>
<td>1.06</td>
<td>4.55</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Reliability of the instrument.** Three techniques were applied to determine the reliability of the two forms of the instrument. These three were the Kuder-Richardson Formula 20, the Kuder-Richardson
Formula 21, and the split half (odd-even) method corrected through the Spearman-Brown prophecy formula. The reliability coefficients and the standard errors of measurement associated with each of these comparison group scores are summarized in TABLE 10.

**TABLE 10**  
RELIABILITY COEFFICIENTS AND STANDARD ERRORS OF MEASUREMENT FOR PRETEST SCORES BY FORM OF TEST AND TYPE OF PROGRAM

<table>
<thead>
<tr>
<th>Student Group</th>
<th>Form 1</th>
<th>Form 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>K-R 20</td>
<td>K-R 21</td>
</tr>
<tr>
<td></td>
<td>r  S.E.</td>
<td>r  S.E.</td>
</tr>
<tr>
<td>Plan B Students</td>
<td>.87 4.34</td>
<td>.84 4.75</td>
</tr>
<tr>
<td>Plan C Students</td>
<td>.80 4.40</td>
<td>.76 4.81</td>
</tr>
<tr>
<td>Total B and C</td>
<td>.84 4.39</td>
<td>.81 4.78</td>
</tr>
<tr>
<td>Plan B Students</td>
<td>.84 4.25</td>
<td>.78 4.86</td>
</tr>
<tr>
<td>Plan C Students</td>
<td>.92 4.26</td>
<td>.90 4.78</td>
</tr>
<tr>
<td>Total B and C</td>
<td>.89 4.29</td>
<td>.86 4.82</td>
</tr>
</tbody>
</table>

Pretest item analysis. Because the primary purpose of this study was the development of an objective achievement instrument in distributive education, an item analysis was completed for the two forms of the instrument on both the pretest and posttest. Five kinds
of information were obtained for the items of the two forms for each of the six comparison groups identified before. The formulas utilized in computing the item analysis data are presented in APPENDIX I.

The first was a count, by each of the five possible choices on each item, of the responses of the top twenty-seven and one-half percent of the students (hereafter called the upper percent), and the lower twenty-seven and one-half percent (hereafter called the lower percent) in each of the six comparison groups. This count is effective in illustrating the effectiveness of the distractors used in each multiple choice item. Good distractors are those which are selected more frequently by the lower scoring group. When a particular distractor is more popular in the upper percent, or is chosen by none of the two groups, it is of doubtful value and should be examined carefully.

The second computation in the item analysis produced the relative difficulty of each of the two hundred multiple choice items. This statistic is the calculation of the percentage of the total number of persons in each comparison group that answered each of the items correctly. For example, an item with a difficulty level of .70 would mean that seventy percent of the students in this group answered that item correctly. A low difficulty level for an item is generally considered to be a characteristic of a "mastery" item if the item is acceptable in all other ways.

The third type of information about the pretest and posttest items came from the computation of the discrimination index for each
item as answered by the students in each of the six comparison groups. This index is the ratio of the difference between the wrong answers in the lower percent and the upper percent and the total number of students in the lower percent. Negative discrimination is to be avoided since it represents the fact that a higher proportion of persons in the lower percent answered the item correctly than persons in the upper percent.

The fourth analysis applied to the test items was the phi-coefficient. The phi-coefficient is a correlation involving the difference in the proportions of persons in both the upper and lower percent that answered the item correctly and the total proportion of the upper and lower percent answering the particular single item correctly. In effect, the consistency of correct responses on an item between the upper and lower percent is determined. The significance of the phi-coefficient was tested at the .05 level through the use of the chi-square.

The fifth analysis performed on the items was the point biserial correlation coefficient. The essence of this coefficient is the correlation between the right-wrong responses of the upper and lower percent on each item and the total right-wrong responses of the upper and lower percent as a continuous variable. This analysis involves the degree to which the responses of the two comparison groups, the upper and lower percent, correlate with their right-wrong responses on the total examination. The significance of the point biserial correlation was tested at the .05 level of \( \text{T} \).
The item analysis data for both forms of the pretest are presented as APPENDIX F and APPENDIX G. The item analysis data for the posttest of both forms are presented as APPENDIX H and APPENDIX I. The items on the pretest were arranged for purposes of posttesting from the highest to the lowest difficulty level. The first item in APPENDIX F, for example, was item number 49 on the pretest. In rearranging the items from the easiest to the hardest on the posttest, item 49 became item 1 on the second test because it had the highest difficulty level of the one hundred pretest items. The difficulty level, discrimination index, phi-coefficient, and point biserial correlation coefficient are listed for each test item by type of program (Plan B, Plan C, Total B and C) and form of test (Form 1 or Form 2). Indication is made of the items which were revised before resubmission as part of the posttest. Indication is also made in the item analysis summary of those coefficients which were significant at the .05 level of chi-square or t.

**Difficulty indexes.** It has been stated that the difficulty index is a very important item statistic because it is very closely related to item discrimination. Downie and Heath propose that the best test would be made up of items of fifty percent average item difficulty. A well made test would be balanced between a few easy

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items, continuing with items of increasing difficulty, and ending with a few items which only a few of the examinees answer correctly.

The average difficulty level of Form 1 on the pretest was 59.91 for students from Plan B programs and 60.20 for students from Plan C programs. The average difficulty level for all the items in Form 2 was 52.67 for students from Plan B programs and 55.28 for students enrolled in Plan C programs.

In revising items based upon this analysis, it was anticipated that there would be an increase in difficulty level of the items in the posttest. An effort was made to improve the attractiveness of item distractors through revision of poor items on both forms of the instrument. Although such a procedure was expected to deflate the value of increases in scores between the pretest and posttest because of decreases in the difficulty level of the items, the revisions were completed in an effort to retain the average difficulty level of the items on the posttest as close to fifty percent as possible.

The mean difficulty levels for each of the areas of instruction covered in the achievement instruments are presented in TABLE 11. The t ratio was used to test the significance of the differences between the mean difficulty levels computed for each instructional area. The null hypothesis of no difference between the mean difficulty levels achieved by Plan B and Plan C students was accepted at the .05 level of t for nine of the ten instructional areas on Form 1 and all ten of the areas on Form 2. There was a significant difference at the .05 level of t between the mean difficulty level of items
in the Marketing instructional area of Form 1, Plan C students scoring significantly higher in this area.

TABLE 11
MEAN DIFFICULTY LEVELS FOR PRETEST ITEMS GROUPED BY INSTRUCTIONAL AREA AND COMPARED BY FORM OF TEST AND TYPE OF PROGRAM

<table>
<thead>
<tr>
<th>Instructional Area</th>
<th>( \bar{x} ) Difficulty Level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Form 1 Plan B Plan C</td>
</tr>
<tr>
<td>Human Relations</td>
<td>.703 .700</td>
</tr>
<tr>
<td>Marketing</td>
<td>.630 .706</td>
</tr>
<tr>
<td>Job Skills and Product Knowledge</td>
<td>.692 .678</td>
</tr>
<tr>
<td>Salesmanship</td>
<td>.604 .644</td>
</tr>
<tr>
<td>Sales Promotion and Advertising</td>
<td>.590 .624</td>
</tr>
<tr>
<td>Orientation to D.E.</td>
<td>.600 .587</td>
</tr>
<tr>
<td>Merchandising</td>
<td>.523 .540</td>
</tr>
<tr>
<td>Retail Mathematics</td>
<td>.547 .498</td>
</tr>
<tr>
<td>Economics of Distribution</td>
<td>.516 .497</td>
</tr>
<tr>
<td>Job Knowledge and Job Adjustment</td>
<td>.530 .478</td>
</tr>
</tbody>
</table>

Although students enrolled in Plan C programs obtained a higher proportion of correct answers and higher means in seven of ten instructional areas on Form 2, the differences were not significant at the .05 level of \( t \). It was also noted earlier that there was no significant difference between total test mean scores of the two groups as measured by the \( z \) test.

In addition, the \( t \)-test was used to determine the significance of the differences between the mean difficulty level of the items grouped according to the knowledge objectives identified earlier.
in this report (terminology, specific facts, conventions, trends and sequences, classifications and categories, criteria, methodology, principles and generalizations, and theories and structures). No significant differences were found at the .05 level of \( t \) between the mean difficulty levels for Plan B and Plan C student scores on Form 1, or between the mean difficulty levels of items in the objective groups on Form 2. The mean difficulty levels for items grouped by knowledge objectives are presented in TABLE 12.

**TABLE 12**

**MEAN DIFFICULTY LEVELS FOR PRETEST ITEMS GROUPED BY INSTRUCTIONAL OBJECTIVE AND COMPARED BY FORM OF TEST AND TYPE OF PROGRAM**

<table>
<thead>
<tr>
<th>Instructional Objective, Knowledge of:</th>
<th>Form 1 Plan B</th>
<th>Form 1 Plan C</th>
<th>Form 2 Plan B</th>
<th>Form 2 Plan C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terminology</td>
<td>.523</td>
<td>.511</td>
<td>.483</td>
<td>.518</td>
</tr>
<tr>
<td>Specific Facts</td>
<td>.758</td>
<td>.735</td>
<td>.494</td>
<td>.531</td>
</tr>
<tr>
<td>Conventions</td>
<td>.556</td>
<td>.559</td>
<td>.569</td>
<td>.615</td>
</tr>
<tr>
<td>Trends and Sequences</td>
<td>.473</td>
<td>.479</td>
<td>.683</td>
<td>.699</td>
</tr>
<tr>
<td>Classifications and Categories</td>
<td>.648</td>
<td>.629</td>
<td>.546</td>
<td>.581</td>
</tr>
<tr>
<td>Criteria</td>
<td>.685</td>
<td>.682</td>
<td>.713</td>
<td>.755</td>
</tr>
<tr>
<td>Methodology</td>
<td>.581</td>
<td>.612</td>
<td>.448</td>
<td>.494</td>
</tr>
<tr>
<td>Principles and Generalizations</td>
<td>.688</td>
<td>.710</td>
<td>.606</td>
<td>.582</td>
</tr>
<tr>
<td>Theories and Structures</td>
<td>.691</td>
<td>.666</td>
<td>.553</td>
<td>.586</td>
</tr>
</tbody>
</table>

**Discrimination indexes.** Ebel states that test items with discrimination indexes above .20 will ordinarily be found to have
sufficient discrimination power for use in most achievement and aptitude tests. Ebel considers that items which yield an index which is .40 or above may be said to be high in discrimination, whereas any item with an index below .20 would be called low in discrimination, and negative discrimination is undesirable and to be avoided.

There were thirty items on the pretest of Form 1 with discrimination indexes below .20, and twenty-eight items on Form 2 of the pretest with discrimination indexes below .20. Nine items on Form 1 and twelve items on Form 2 that had the lowest indexes were revised in an effort to improve their discrimination power.

The mean discrimination of the nine items on Form 1 which were revised was .037 on the pretest and .154 on the posttest. Seven of the nine items had low discrimination on the pretest and two had negative discrimination on the pretest. After revision four of the items on the posttest had acceptable indexes above .20, four items had low discrimination and only one had negative discrimination.

The mean discrimination of the twelve items revised on Form 2 was .066 on the pretest and .195 on the posttest. Six of the items on the posttest discriminated above .20, five discriminated at a low level between 0.0 and .20, and one discriminated negatively. This

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compared to ten of twelve items which had low discrimination on the pretest and two which had negative discrimination.

**Phi-coefficient.** Using the formula \( \text{chi-square} = N \phi^2 \), the phi-coefficient was tested for significance using the .05 value of the phi-coefficient for each of the items on both forms of the instrument. The number of significant phi-coefficients for each of the comparison group scores is summarized in TABLE 13.

**TABLE 13**

<table>
<thead>
<tr>
<th>Comparison Group</th>
<th>Phi-Coefficients</th>
<th>( r ) (PBIS)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Signif. No. of</td>
<td>Signif. No. of</td>
</tr>
<tr>
<td></td>
<td>Value items</td>
<td>Value items</td>
</tr>
<tr>
<td>Form 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type B Students</td>
<td>.25+ 41</td>
<td>.25+ 41</td>
</tr>
<tr>
<td>Type C Students</td>
<td>.21+ 47</td>
<td>.23+ 45</td>
</tr>
<tr>
<td>Total B and C</td>
<td>.16+ 78</td>
<td>.17+ 75</td>
</tr>
<tr>
<td>Students</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Form 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type B Students</td>
<td>.34+ 40</td>
<td>.24+ 52</td>
</tr>
<tr>
<td>Type C Students</td>
<td>.35+ 58</td>
<td>.26+ 66</td>
</tr>
<tr>
<td>Total B and C</td>
<td>.21+ 74</td>
<td>.17+ 79</td>
</tr>
<tr>
<td>Students</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Point biserial correlation. The significance of this correlation coefficient was tested using the null hypothesis of no difference between the obtained correlation and 0. Using the $z$ score and entering the table with $N-2$ degrees of freedom at the .05 level, the number of items found to be significant is presented in TABLE 13.

Acceptable items. The number of items which had a discrimination index greater than .20, and a phi-coefficient and point-biserial correlation coefficient which were both significant at the .05 level on Form 1, for the total Plan B and Plan C group, were sixty-one in number. The number of items meeting all the criteria on Form 2, for the total Plan B and Plan C group, was sixty-nine. There were nine items rewritten on Form 1 and twelve rewritten on Form 2 based upon the failure of these items to meet at least two of the three criteria identified above.

Posttest Results

The posttest was administered during the month of April, 1968. The posttest scores for all students who took the test are presented in TABLE 14.

In computing the differences between the pretest and posttest scores, and in determining the significance of these differences, the scores of students who did not complete both the pretest and posttest were eliminated. The analysis performed on the scores of the students who completed both the tests produced the score characteristics presented in TABLE 15.
### Table 14

**Posttest Score Characteristics by Form of Test and Type of Program**

<table>
<thead>
<tr>
<th>Student Group</th>
<th>No.</th>
<th>Median</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Form 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plan B Students</td>
<td>122</td>
<td>62.50</td>
<td>61.17</td>
<td>12.16</td>
</tr>
<tr>
<td>Plan C Students</td>
<td>125</td>
<td>63.22</td>
<td>63.42</td>
<td>10.87</td>
</tr>
<tr>
<td>Total B and C</td>
<td>247</td>
<td>62.96</td>
<td>62.31</td>
<td>11.87</td>
</tr>
<tr>
<td><strong>Form 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plan B Students</td>
<td>116</td>
<td>60.50</td>
<td>58.92</td>
<td>11.50</td>
</tr>
<tr>
<td>Plan C Students</td>
<td>95</td>
<td>62.20</td>
<td>56.43</td>
<td>18.69</td>
</tr>
<tr>
<td>Total B and C</td>
<td>211</td>
<td>61.25</td>
<td>57.80</td>
<td>15.17</td>
</tr>
</tbody>
</table>

### Table 15

**Posttest Score Characteristics by Form of Test and Type of Program for Students Who Completed Both the Pretest and Posttest**

<table>
<thead>
<tr>
<th>Student Group</th>
<th>No.</th>
<th>Median</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Form 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plan B Students</td>
<td>118</td>
<td>61.67</td>
<td>61.33</td>
<td>12.13</td>
</tr>
<tr>
<td>Plan C Students</td>
<td>123</td>
<td>62.17</td>
<td>64.30</td>
<td>10.68</td>
</tr>
<tr>
<td>Total B and C</td>
<td>241</td>
<td>62.96</td>
<td>62.84</td>
<td>11.50</td>
</tr>
<tr>
<td><strong>Form 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plan B Students</td>
<td>113</td>
<td>61.75</td>
<td>60.33</td>
<td>11.49</td>
</tr>
<tr>
<td>Plan C Students</td>
<td>91</td>
<td>65.16</td>
<td>62.03</td>
<td>10.46</td>
</tr>
<tr>
<td>Total B and C</td>
<td>204</td>
<td>62.40</td>
<td>61.09</td>
<td>10.96</td>
</tr>
</tbody>
</table>
In order to determine if there are any significant differences between the pretest and posttest achievement scores, these first and second test scores were compared and the results of this comparison are presented in TABLE 16.

### TABLE 16

**COMPARISON OF PRETEST AND POSTTEST MEANS BY FORM OF TEST AND TYPE OF PROGRAM**

<table>
<thead>
<tr>
<th>Student Group</th>
<th>No.</th>
<th>$\bar{x}$ Scores</th>
<th>$z$ test</th>
<th>Significant at .05 level?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Pretest Posttest</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Form 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plan B Students</td>
<td>118</td>
<td>60.41 61.33</td>
<td>.42</td>
<td>No</td>
</tr>
<tr>
<td>Plan C Students</td>
<td>123</td>
<td>59.93 64.30</td>
<td>4.34</td>
<td>Yes</td>
</tr>
<tr>
<td>Total B and C</td>
<td>241</td>
<td>60.16 62.84</td>
<td>3.23</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Form 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plan B Students</td>
<td>113</td>
<td>57.03 60.33</td>
<td>2.80</td>
<td>Yes</td>
</tr>
<tr>
<td>Plan C Students</td>
<td>991</td>
<td>57.25 62.03</td>
<td>4.42</td>
<td>Yes</td>
</tr>
<tr>
<td>Total B and C</td>
<td>204</td>
<td>57.13 61.09</td>
<td>5.17</td>
<td>Yes</td>
</tr>
</tbody>
</table>

The significance of the differences between the means was also tested by type of program and form of the instrument through the $z$ test at the .05 level. The results of this analysis are presented in TABLE 17.

The reliability coefficients, computed through use of the Kuder-Richardson Formula 20, the Kuder-Richardson Formula 21, and the split-half method, along with the standard errors of measurement associated with the scores are presented in TABLE 18.
### TABLE 17

POSTTEST MEAN SCORES COMPARED BY FORM OF TEST AND TYPE OF PROGRAM

<table>
<thead>
<tr>
<th>Comparison</th>
<th>Standard Error of Difference Between Means</th>
<th>$z$ test</th>
<th>$z$ significant at .05 Level?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form 1-Plan B with C</td>
<td>1.480</td>
<td>2.03</td>
<td>Yes</td>
</tr>
<tr>
<td>Form 2-Plan B with C</td>
<td>1.547</td>
<td>2.00</td>
<td>Yes</td>
</tr>
<tr>
<td>Plan B-Form 1 with 2</td>
<td>1.561</td>
<td>0.64</td>
<td>No</td>
</tr>
<tr>
<td>Plan C-Form 1 with 2</td>
<td>1.466</td>
<td>0.61</td>
<td>No</td>
</tr>
<tr>
<td>Total B and C-Form 1 with Form 2</td>
<td>1.070</td>
<td>1.59</td>
<td>No</td>
</tr>
</tbody>
</table>

### TABLE 18

RELIABILITY COEFFICIENTS AND STANDARD ERRORS OF MEASUREMENT FOR POSTTEST SCORES BY FORM OF TEST AND TYPE OF PROGRAM

<table>
<thead>
<tr>
<th>Student Group</th>
<th>K-R 20</th>
<th>K-R 21</th>
<th>Split Half</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>r  S.E.</td>
<td>r  S.E.</td>
<td>r  S.E.</td>
</tr>
<tr>
<td>Form 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plan B Students</td>
<td>0.88</td>
<td>0.30</td>
<td>0.86</td>
</tr>
<tr>
<td>Plan C Students</td>
<td>0.85</td>
<td>0.25</td>
<td>0.83</td>
</tr>
<tr>
<td>Total B and C</td>
<td>0.86</td>
<td>0.29</td>
<td>0.85</td>
</tr>
<tr>
<td>Form 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plan B Students</td>
<td>0.87</td>
<td>0.18</td>
<td>0.88</td>
</tr>
<tr>
<td>Plan C Students</td>
<td>0.95</td>
<td>0.09</td>
<td>0.94</td>
</tr>
<tr>
<td>Total B and C</td>
<td>0.92</td>
<td>0.17</td>
<td>0.92</td>
</tr>
</tbody>
</table>
Each of the two forms of the Marketing and Distribution achievement instruments was divided into sub-tests meant to measure student achievement in ten composite subject matter instructional areas and nine knowledge objectives. The items were grouped by difficulty level (the percent of the total group that answered each item correctly) and compared on the basis of the mean difficulty levels by form of test and type of program. TABLE 19 summarizes the mean difficulty levels of the items on Form 1 when these items are grouped by instructional area for Plan B and Plan C students on both the pretest and posttest scores. TABLE 20 presents the data.

TABLE 19

COMPARISON OF MEAN DIFFICULTY LEVELS OF PRETEST AND POSTTEST ITEMS GROUPED BY INSTRUCTIONAL AREA-FORM 1

<table>
<thead>
<tr>
<th>Composite Subject Matter Instructional Area</th>
<th>( \bar{X} ) Difficulty Levels</th>
<th>Plan B</th>
<th>Plan C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pretest</td>
<td>Posttest</td>
<td>Pretest</td>
</tr>
<tr>
<td>Human Relations</td>
<td>.700</td>
<td>.704</td>
<td>.703</td>
</tr>
<tr>
<td>Job Skills and Product Knowledge</td>
<td>.692</td>
<td>.595</td>
<td>.667</td>
</tr>
<tr>
<td>Marketing</td>
<td>.706</td>
<td>.557</td>
<td>.630</td>
</tr>
<tr>
<td>Salesmanship</td>
<td>.626</td>
<td>.598</td>
<td>.604</td>
</tr>
<tr>
<td>Orientation to Distributive Education</td>
<td>.587</td>
<td>.690 (S)</td>
<td>.600</td>
</tr>
<tr>
<td>Sales Promotion and Advertising</td>
<td>.619</td>
<td>.662</td>
<td>.593</td>
</tr>
<tr>
<td>Retail Mathematics</td>
<td>.494</td>
<td>.650 (S)</td>
<td>.547</td>
</tr>
<tr>
<td>Job Knowledge and Job Adjustment</td>
<td>.598</td>
<td>.693</td>
<td>.663</td>
</tr>
<tr>
<td>Merchandising</td>
<td>.523</td>
<td>.621 (S)</td>
<td>.523</td>
</tr>
<tr>
<td>Economics of Distribution</td>
<td>.516</td>
<td>.544</td>
<td>.515</td>
</tr>
</tbody>
</table>
for items compared by instructional objective for Plan B and Plan C students on both the pretest and posttest of Form 1.

**TABLE 20**

**COMPARISON OF MEAN DIFFICULTY LEVELS OF PRETEST AND POSTTEST ITEMS GROUPED BY INSTRUCTIONAL OBJECTIVE—FORM 1**

<table>
<thead>
<tr>
<th>Composite Subject Matter Instructional Objective</th>
<th>X Difficulty Levels</th>
<th>Plan B</th>
<th>Plan C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Pretest</td>
<td>Posttest</td>
</tr>
<tr>
<td>Terminology</td>
<td>.529</td>
<td>.613 (S)</td>
<td>.508</td>
</tr>
<tr>
<td>Specific Facts</td>
<td>.758</td>
<td>.679</td>
<td>.735</td>
</tr>
<tr>
<td>Conventions</td>
<td>.544</td>
<td>.654 (S)</td>
<td>.550</td>
</tr>
<tr>
<td>Trends and Sequences</td>
<td>.473</td>
<td>.502</td>
<td>.479</td>
</tr>
<tr>
<td>Classifications and Categories</td>
<td>.561</td>
<td>.620</td>
<td>.538</td>
</tr>
<tr>
<td>Criteria</td>
<td>.685</td>
<td>.713</td>
<td>.682</td>
</tr>
<tr>
<td>Methodology</td>
<td>.581</td>
<td>.633</td>
<td>.612</td>
</tr>
<tr>
<td>Principles and Generalizations</td>
<td>.689</td>
<td>.632</td>
<td>.710</td>
</tr>
<tr>
<td>Theories and Structures</td>
<td>.691</td>
<td>.643</td>
<td>.666</td>
</tr>
</tbody>
</table>

**TABLE 21 and TABLE 22 summarize the data on items grouped by composite subject matter and knowledge objective for Form 2. Each of the tables (19-22) present an indication of the significance (S) of the mean difference of the sub-test item difficulty levels as computed through the t test at the .05 level.**

No significant differences were found at the .05 level of t between the posttest mean difficulty levels of test items when compared by items grouped into subject matter or instructional objective areas for Plan B or Plan C students on either Form of the achievement instrument.
TABLE 21
COMPARISON OF MEAN DIFFICULTY LEVELS OF PRETEST AND POSTTEST ITEMS GROUPED BY INSTRUCTIONAL AREA-FORM 2

<table>
<thead>
<tr>
<th>Composite Subject Matter</th>
<th>Instructional Area</th>
<th>Plan B</th>
<th>Plan C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Pretest</td>
<td>Posttest</td>
</tr>
<tr>
<td>Human Relations</td>
<td></td>
<td>.663</td>
<td>.714</td>
</tr>
<tr>
<td>Job Skills and Product</td>
<td>Knowledge</td>
<td>.569</td>
<td>.578</td>
</tr>
<tr>
<td></td>
<td>Marketing</td>
<td>.426</td>
<td>.551 (S)</td>
</tr>
<tr>
<td></td>
<td>Salesmanship</td>
<td>.662</td>
<td>.656</td>
</tr>
<tr>
<td></td>
<td>Orientation to Distributive Education</td>
<td>.492</td>
<td>.514</td>
</tr>
<tr>
<td></td>
<td>Sales Promotion and Advertising</td>
<td>.463</td>
<td>.480</td>
</tr>
<tr>
<td></td>
<td>Retail Mathematics</td>
<td>.435</td>
<td>.560 (S)</td>
</tr>
<tr>
<td></td>
<td>Job Knowledge and Job Adjustment</td>
<td>.651</td>
<td>.581</td>
</tr>
<tr>
<td></td>
<td>Merchandising</td>
<td>.569</td>
<td>.645 (S)</td>
</tr>
<tr>
<td></td>
<td>Economics of Distribution</td>
<td>.459</td>
<td>.568</td>
</tr>
</tbody>
</table>

TABLE 22
COMPARISON OF MEAN DIFFICULTY LEVELS OF PRETEST AND POSTTEST ITEMS GROUPED BY INSTRUCTIONAL OBJECTIVE-FORM 2

<table>
<thead>
<tr>
<th>Composite Subject Matter</th>
<th>Instructional Objective</th>
<th>Plan B</th>
<th>Plan C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Pretest</td>
<td>Posttest</td>
</tr>
<tr>
<td>Terminology</td>
<td></td>
<td>.483</td>
<td>.455</td>
</tr>
<tr>
<td>Specific Facts</td>
<td></td>
<td>.494</td>
<td>.531</td>
</tr>
<tr>
<td>Conventions</td>
<td></td>
<td>.569</td>
<td>.633</td>
</tr>
<tr>
<td>Trends and Sequences</td>
<td></td>
<td>.683</td>
<td>.791 (S)</td>
</tr>
<tr>
<td>Classifications and Categories</td>
<td></td>
<td>.546</td>
<td>.571</td>
</tr>
<tr>
<td>Criteria</td>
<td></td>
<td>.713</td>
<td>.713</td>
</tr>
<tr>
<td>Methodology</td>
<td></td>
<td>.448</td>
<td>.578 (S)</td>
</tr>
<tr>
<td>Principles and Generalizations</td>
<td></td>
<td>.606</td>
<td>.620</td>
</tr>
<tr>
<td>Theories and Structures</td>
<td></td>
<td>.553</td>
<td>.632</td>
</tr>
</tbody>
</table>
Posttest Item Analysis

The difficulty level, discrimination index, phi-coefficient, and point biserial correlation coefficient were computed for each of the one hundred items on both forms of the test for three comparison groups, Plan B students, Plan C students, and the total scores of Plan B and Plan C students combined. The summaries of the posttest item analyses are presented as APPENDIX H and APPENDIX I.

The mean difficulty level of items on Form 1 is .6278 for Plan B students and .6389 for Plan C students. The mean difficulty level of items on Form 2 is .5988 for Plan B students and .5809 for Plan C students. This compares to a mean difficulty level on the pretest of Form 1 of .5991 for students from Plan B programs and .6020 for students from Plan C programs. The pretest mean difficulty levels for Form 2 on the pretest was .5267 for students from Plan B programs and .5528 for students enrolled in Plan C programs. It should be remembered that an attempt was made to retain discrimination power and also the difficulty levels of the posttest close to .50 by revising nine items on Form 1 and twelve items on Form 2 on the posttest. Through a revision of items with high difficulty levels and low or negative discrimination it was felt that the difficulty level of the entire instrument could be controlled to a small degree.

The mean difficulty level of the nine items revised on Form 1 was .269 on the pretest and .303 on the posttest. The mean difficulty level of twelve items revised on Form 2 was .687 on the pretest and .602 on the posttest. There was no significance to the differences
between the pretest and posttest difficulty levels of the revised items when the differences were tested with $t$ at the .05 level.

The discrimination power of the test items is presented in TABLE 23. The significance of the Phi-coefficients and Point biserial Correlation Coefficients is summarized in TABLE 24.

**TABLE 23**

**DISCRIMINATION INDEXES FOR POSTTEST ITEMS BY FORM OF TEST AND TYPE OF PROGRAM**

<table>
<thead>
<tr>
<th>Student Group</th>
<th>Acceptable .20 or Greater</th>
<th>High .40 or Greater</th>
<th>Negative Less than 0</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Form 1</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plan B Students</td>
<td>25</td>
<td>31</td>
<td>6</td>
</tr>
<tr>
<td>Plan C Students</td>
<td>26</td>
<td>56</td>
<td>4</td>
</tr>
<tr>
<td>Total B and C</td>
<td>57</td>
<td>13</td>
<td>6</td>
</tr>
<tr>
<td><strong>Form 2</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plan B Students</td>
<td>41</td>
<td>27</td>
<td>9</td>
</tr>
<tr>
<td>Plan C Students</td>
<td>43</td>
<td>14</td>
<td>4</td>
</tr>
<tr>
<td>Total B and C</td>
<td>45</td>
<td>36</td>
<td>3</td>
</tr>
</tbody>
</table>

**Measurement capacity of the marketing and distribution achievement instruments**

The capacity of the instruments to measure achievement in subject matter unique to distributive education instruction was assessed on a limited scale in three ways. The first was the comparison of pretest and posttest mean scores of the upper 27.5% of the total range of scores on the pretest, and the pretest and posttest scores of the lower 27.5% of the pretest scores. This
TABLE 24

NUMBER OF POSTTEST ITEMS WITH PHI-COEFFICIENTS AND POINT BISERIAL CORRELATION COEFFICIENTS SIGNIFICANT AT THE .05 LEVEL

<table>
<thead>
<tr>
<th>Student Group</th>
<th>Phi-Coefficients</th>
<th>r (PBIS)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Significant No.</td>
<td>Signifi-</td>
</tr>
<tr>
<td></td>
<td>Value Items</td>
<td>cant</td>
</tr>
<tr>
<td>Form 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plan B Students</td>
<td>.23+</td>
<td>68</td>
</tr>
<tr>
<td>Plan C Students</td>
<td>.23+</td>
<td>67</td>
</tr>
<tr>
<td>Total B and C</td>
<td>.12+</td>
<td>89</td>
</tr>
<tr>
<td>Form 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plan B Students</td>
<td>.24+</td>
<td>60</td>
</tr>
<tr>
<td>Plan C Students</td>
<td>.27+</td>
<td>79</td>
</tr>
<tr>
<td>Total B and C</td>
<td>.13+</td>
<td>88</td>
</tr>
</tbody>
</table>

Comparison is presented in TABLE 25. This twenty-fifth table shows that the students whose scores were in the bottom 27.5% of the total range of scores on the pretest had significant gains in all six of the comparison groups. Those students whose scores placed them in the upper 27.5% of the total range of scores had decreases in mean scores in all the six comparison groups, two of which decreases were significant at the .05 level of t.

The second appraisal of the measurement capabilities of the achievement instruments was the computation of the Pearson Product-Moment Correlation Coefficient between the achievement test scores and the Henman-Nelson Intelligence Test Scores of a group of students from one school in which the students had significant gains in their
TABLE 25
COMPARISON OF PRETEST AND POSTTEST MEAN SCORES OF THOSE STUDENTS IN THE UPPER AND LOWER PERCENT OF PRETEST SCORES FOR WHICH THE POSTTEST SCORES WERE AVAILABLE

<table>
<thead>
<tr>
<th>Student Group</th>
<th>Number</th>
<th>Pretest Mean</th>
<th>Posttest Mean</th>
<th>Mean Difference</th>
<th>Mean Difference Significant at .05 Level?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form 1-Plan B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper Percent</td>
<td>38</td>
<td>73.2</td>
<td>71.7</td>
<td>-1.5</td>
<td>No</td>
</tr>
<tr>
<td>Lower Percent</td>
<td>36</td>
<td>49.2</td>
<td>52.7</td>
<td>3.5</td>
<td>Yes</td>
</tr>
<tr>
<td>Form 1-Plan C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper Percent</td>
<td>34</td>
<td>74.8</td>
<td>72.6</td>
<td>-2.2</td>
<td>Yes</td>
</tr>
<tr>
<td>Lower Percent</td>
<td>32</td>
<td>45.6</td>
<td>54.6</td>
<td>8.9</td>
<td>Yes</td>
</tr>
<tr>
<td>Form 1-Total B and C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper Percent</td>
<td>72</td>
<td>73.9</td>
<td>72.2</td>
<td>-1.7</td>
<td>Yes</td>
</tr>
<tr>
<td>Lower Percent</td>
<td>68</td>
<td>47.5</td>
<td>53.4</td>
<td>5.9</td>
<td>Yes</td>
</tr>
<tr>
<td>Form 2-Plan B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper Percent</td>
<td>28</td>
<td>69.7</td>
<td>69.4</td>
<td>-.5</td>
<td>No</td>
</tr>
<tr>
<td>Lower Percent</td>
<td>26</td>
<td>41.6</td>
<td>49.6</td>
<td>8.0</td>
<td>Yes</td>
</tr>
<tr>
<td>Form 2-Plan C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper Percent</td>
<td>32</td>
<td>70.1</td>
<td>68.9</td>
<td>-1.2</td>
<td>No</td>
</tr>
<tr>
<td>Lower Percent</td>
<td>27</td>
<td>40.2</td>
<td>56.0</td>
<td>15.8</td>
<td>Yes</td>
</tr>
<tr>
<td>Form 2-Total B and C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper Percent</td>
<td>60</td>
<td>69.9</td>
<td>69.1</td>
<td>-.8</td>
<td>No</td>
</tr>
<tr>
<td>Lower Percent</td>
<td>53</td>
<td>40.9</td>
<td>52.2</td>
<td>11.3</td>
<td>Yes</td>
</tr>
</tbody>
</table>
pretest scores. The correlation coefficient between the pretest scores of these twenty-four students and their intelligence test scores was .740. The correlation coefficient between the posttest scores of these students and their intelligence test scores was .505.

The third appraisal completed was the computation of the Spearman Rank Order Correlation Coefficient between the achievement test rank and the senior class rank of ninety-five students from six different schools and the rank correlation coefficient between these student's pretest and posttest rank. The rank order correlation coefficients are presented in TABLE 26.

### TABLE 26

SPEARMAN RANK ORDER CORRELATION COEFFICIENTS BETWEEN THE SENIOR CLASS RANK OF NINETY-FIVE SENIOR STUDENTS AND THEIR MARKETING AND DISTRIBUTION TEST RANK AND BETWEEN THEIR PRETEST AND POSTTEST RANK

<table>
<thead>
<tr>
<th>Students Group and School</th>
<th>g test of Mean Difference, Pretest compared to Posttest</th>
<th>Rho Between Pretest and Posttest</th>
<th>Rho Between Senior Class Rank and Pretest Posttest</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Form 1</td>
<td></td>
<td>g test</td>
<td></td>
</tr>
<tr>
<td>School B-1</td>
<td>12</td>
<td>1.62</td>
<td>.37</td>
</tr>
<tr>
<td>School B-2</td>
<td>19</td>
<td>.524</td>
<td>.71 (S)</td>
</tr>
<tr>
<td>School C-1</td>
<td>13</td>
<td>4.06 (S)</td>
<td>.69 (S)</td>
</tr>
<tr>
<td>School C-2</td>
<td>24</td>
<td>3.67 (S)</td>
<td>.68 (S)</td>
</tr>
<tr>
<td>Form 2</td>
<td></td>
<td>g test</td>
<td></td>
</tr>
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<td>.38</td>
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<tr>
<td>School C</td>
<td>18</td>
<td>2.22 (S)</td>
<td>.73 (S)</td>
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The significance of the rank order correlation coefficients was tested with $t$ at the .05 level. All the correlation coefficients between the class rank and the posttest rank were significant for students who had gains in their scores between the pretest and posttest and for which the mean gains increased between the two achievement testings. None of the rank order correlation coefficients were significant for the scores of school B students who took Form 2 and had no change in pretest and posttest score. It can be seen that there is an increase in the Rho between posttest rank and senior class rank over the Rho between pretest and senior class rank for students with gains in mean scores between the pretest and the posttest.
CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The purpose of this study was to develop and test an instrument for evaluating student learning of the composite subject matter of cooperative distributive education on the secondary level in Ohio. In developing the instrument, a subsidiary purpose was to determine the instrument's measurement capabilities by comparing the subject matter achievement of students from two differing types of cooperative education programs in Ohio.

Initiating the development of this achievement instrument involved three stages:

1. Determination of measurable instructional objectives in distributive education.

2. Development of an instrument to measure student accomplishment of the objective identified with the purpose of this study.

3. Trial of the instrument through measurement of achievement of this objective on the part of students from representative schools selected for purposes of comparison.

A set of statements about the objectives, program phases, and content of distributive education was drawn from a review of the literature. This set of statements was submitted to a sample of distributive education coordinators in Ohio. There was almost complete agreement among these educators with the instructional objectives and instructional phases as stated. In carrying out the
objectives of distributive education, these educators agreed that four types of activities are undertaken: on-the-job training, related composite subject matter instruction, related speciality subject matter instruction, and youth club activities.

The related composite subject matter was uniformly said to contain instruction in four areas appropriate to marketing and distribution occupations: intellectual abilities and knowledges; manipulative or motor skills; interests, values and attitudes; appreciations and adjustments.

Since the most universally recommended objective of distributive education was intellectual abilities and knowledges, this instructional objective was chosen for purposes of measurement. The content was drawn and the instrument constructed to measure student achievement of this instructional objective.

The instructional content associated with the knowledge objective of distributive education composite subject matter was drawn from an analysis of textbooks and teaching materials. A list of content topics was submitted to the original sample of Ohio coordinators and the final subject matter of the achievement instrument was drawn from those topics upon which there was almost complete agreement by the distributive educators that this subject matter should be taught in distributive education related instruction.
The instrument developed was submitted for evaluation and validation to a group of non-Ohio distributive educators with known research and instructional expertise and to a portion of the original sample of Ohio distributive educators.

After a trial was completed, two forms of the instrument were administered to secondary senior students in Plan B programs (two hours of related classroom each day for one year), and to seniors in Plan C programs (one hour of related instruction each day for two years) in Ohio distributive education. The design of this study is illustrated in Figure 4.

Figure 4
Design for this marketing and distribution composite subject matter achievement study

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<td>Students</td>
<td>0₁</td>
<td>X</td>
</tr>
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<td>0₂</td>
<td>Form 1</td>
</tr>
<tr>
<td></td>
<td>0₂</td>
<td>Form 2</td>
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</table>

Plan C ½X 0₁ ½X 0₂ Form 1
Students ½X 0₁ ½X 0₂ Form 2

The symbol 0₁ refers to the pretest measurement, the symbol 0₂ refers to the posttest measurement. An X in the Plan B portion of the design represents the related classroom instructional treatment these students received. The ½X in the Plan C portion of the design
signifies that Plan C students completed the related classroom instructional treatment in two installments, finishing the first half of the instruction in their junior year prior to the pretest and finishing the second half between the pretest and posttest.

That portion of the design numbered (1) amounts to a pre-experimental design as identified by Campbell and Stanley. That portion identified as (2) was labeled a non-equivalent control group design by Campbell and Stanley.

A partial indication of the equivalency of Plan B and Plan C students was available through a test of the difference between the mean grade point averages of students from four schools, two schools each from Plan B and Plan C programs. The mean grade point average (based upon a 4 point system) of twenty-nine students from two schools with Plan B distributive education programs was 1.891. The mean grade point average of thirty-seven Plan C students (based upon a 4 point system) was 1.804. No significance was found to the difference between the mean grade point average of these two groups of students through the use of the t test at the .05 level.

On the first, or pretest administration, no significant differences were found between the mean scores of the Plan B or Plan C students on either form of the instrument. Although the students from Plan C programs had already completed one hour of instruction

1Donald T. Campbell and Julian C. Stanley, op. cit., p. 12.

2Ibid., p. 47.
per day during their eleventh year of high school, their scores were not significantly different from those of Plan B students who had just begun their instruction at the time of the pretest.

These same students completed the achievement instrument on a posttest basis late in the 1967-68 school year. The scores of two hundred and thirty-one Plan B students and two hundred and fourteen Plan C students on two forms of the achievement instrument provided the data for testing the two major null hypotheses of this study. The null hypotheses tested were:

1. There is no significant achievement by distributive education students in related composite subject matter knowledge during the period of this study.

2. There is no significant difference in the learning of distributive education students from two different types of programs in the knowledge appropriate to marketing and distribution composite subject matter during the period of this study.

Student test scores were grouped into six classifications, according to the type of distributive education program in which they were enrolled and the form of the test which they completed. The first null hypothesis was rejected at the .05 level for five out of the six comparison groups. There were significant gains in scores between the pretest and posttest for Plan B students on Form 2 of the instrument and significant gains for Plan C students on both forms of the instrument. In addition, there were significant gains in scores for both Plan B and Plan C students when their scores were pooled for both forms of the instrument.
The second hypothesis was rejected at the .05 level of significance for both Form 1 and Form 2. There were significantly higher scores for Plan C students on the posttest of both forms of the test.

No significant differences were found between the students' scores on the two forms of the test when z tests were computed to determine the comparability of the two forms. Plan B students did not score significantly different from other Plan B students who took the alternate form of the test. Plan C students who took one form of the test did not score significantly different from the Plan C students who took the other form of the test.

The characteristics of the achievement instrument were determined through a pretest and posttest item analysis. The pretest item analysis provided an evaluation of the measurement capabilities of each of the test items. Sixty percent of the items on Form 1 were acceptable or high in discrimination. About seventy percent of the items on Form 2 were acceptable for measurement purposes. Nine items on Form 1 were unacceptable and revised. Twelve items on Form 2 were unacceptable and revised.

The posttest item analysis indicated a high reliability (.85-.95) for both forms and pointed out promising item characteristics. Better than eighty percent of the items on both forms of the posttest had significantly high discrimination indexes, phi-coefficients, and point biserial correlations.

It was noted earlier that a mean difficulty level of .50 for all the test items is probably the most desirable for measurement.
purposes. The mean difficulty levels for the instruments as computed for the six comparison groups ranged from .5799 to .6389.

The items on both forms were grouped into nine instructional objective areas and ten composite subject matter areas to form sub-tests in order to find out if there was any achievement in specific objectives or subject matter.

No significant differences were found at the .05 level of $t$ on the pretest when items grouped according to instructional knowledge objective were compared by form of test and type of program. There was one difference significant at the .05 level of $t$ for items grouped according to ten subject matter areas. Plan C students scored significantly higher than Plan B students in the Marketing subject area of Form 1.

When posttest items were grouped according to composite subject matter instructional areas significant increases in scores for Plan B and Plan C students were found on Form 1 in the areas of (1) Orientation to Distributive Education, (2) Retail Mathematics, (3) Merchandising, and (4) Sales Promotion and Advertising.

When the test items were grouped by instructional knowledge objectives on Form 1, significant increases in scores were found for Plan B students in the areas of (1) Terminology and (2) Conventions, and for Plan C students in the areas of (1) Terminology and (2) Classifications and Categories.

Form 2 posttest items, when grouped by subject matter area, pointed out significant differences between pretest and posttest scores. Increases in posttest scores which were significant at the
.05 level of $t$ were found for Plan B students in the areas of (1) Marketing, (2) Retail Mathematics, and (3) Merchandising. Plan C students had significant increases in scores in (1) Retail Mathematics, and (2) Economics of Distribution. However, Plan C students also had significant decreases in scores on Form 2 in the subject matter areas of (1) Job Skills and Product Knowledge, and (2) Job Knowledge and Job Adjustment. Plan B students gained significantly on Form 2 in the knowledge of (1) Trends and Sequences, and (2) Methodology. Plan C students had significant increases in the knowledge of marketing and distribution Methodology.

Some limited findings indicated that the achievement instrument is less highly correlated with intelligence test scores on the posttest than on the pretest, and that the instruments are highly correlated with class rank as an example of general academic achievement. For students' with significant mean differences between pretest and posttest scores, the correlation was consistently larger between posttest rank and class rank than between pretest rank and senior class rank.

**Conclusions**

On the basis of the data gathered through this study and the analyses conducted, the following conclusions are made:

1. There is a high level of agreement among Ohio coordinators concerning the objectives, program phases, and instructional content of cooperative distributive education on the secondary level.
2. Ohio coordinators indicated that related composite subject matter instruction is similar enough in Ohio that outcomes in learning can be adequately measured from school to school.

3. It is possible to develop an instrument which can measure the related composite subject matter learning of secondary cooperative distributive education students in Ohio.

4. The instrument developed in this study had sufficient validity, reliability and discrimination power to adequately measure student learning of the knowledge objective of related composite subject matter instruction in secondary distributive education in Ohio.

5. The two forms of the instrument proved to be comparable and both are adequate alternates of the other.

6. There was a significant increase in student learning of the knowledges appropriate to distributive education related instruction during the period of this study.

7. There was a significant difference in the learning of composite subject matter knowledge by students from two different program plans in Ohio during the period of this study, Plan C students scoring significantly higher than Plan B students on both instruments.

Discussion of Conclusions

High agreement was found among distributive educators that knowledge is one of the main objectives of distributive education
related classroom instruction on the secondary level. Studies have been conducted which identify more precisely the knowledge needed by distributive workers. However, the research review revealed that little has been done prior to this present study to evaluate the learning by distributive education students of the knowledge deemed important by distributive educators.

The conclusions of this study add further support to the proposition that more effort should be made by distributive educators to specify instructional objectives and to isolate the effect of their educational program on the accomplishment of these objectives. The effort to more carefully define and measure instructional objectives will lend weight to the necessity for further instrumentation in distributive education.

No literature or research was reviewed which attempted to determine the source or characteristics of student subject matter learning in distributive education or to correlate instruction with that provided in other courses of study or educational activities on the secondary level.

The rather high level of the pretest scores for both Plan B and Plan C students, as well as the lack of significant differences between their pretest scores, leads one to hypothesize that a high proportion of the knowledge content sampled in the instrument developed for this study is not unique to the distributive education instructional program.
Although the means for all students grouped by form of test and type of program showed slight to modest increases between the pretest and posttest, there were more pronounced differences between the pretest and posttest mean scores for students grouped by classes from different schools.

The differences between the pretest and posttest means scores for Plan B classes on Form 1 ranged from -3.1 to 4.8 with four mean increases out of eight class means. The differences between the pretest and posttest mean scores for Plan C classes on Form 1 ranged from -2.1 to 10.2 with six mean increases out of seven class means.

The differences between pretest and posttest mean scores for Plan B students grouped by classes ranged from -1.4 to 7.5 with five mean increases out of seven class means. The differences between the pretest and posttest mean scores for Plan C classes on Form 2 ranged from -1.1 to 23.4 with five mean increases out of six class means.

These mean differences point out significant variations among classes in the level of student achievement as measured by the marketing and distribution achievement instrument. Such variations might have been the result of numerous variables such as differences in the teaching ability of coordinators, differences in the learning ability of students from different schools, the use of different materials and aids, and differences in the subject matter of particular schools. Further effort should be made to determine the effects of such variables on student achievement of composite subject matter in distributive education.
The increases in scores measured by the instruments, the promising item characteristics, and the partial comparisons with class rank and intelligence test scores indicates a high potential for the instrument in measurement of student marketing and distribution knowledge outcomes.

Because a few test items were unacceptable in terms of item discrimination on both forms of the instrument, these particular items could be revised and readministered to students to determine their measurement characteristics. Another possibility is to shorten the tests to include the best items and to develop a variety of other types of items in addition to multiple choice. A third, and possibly more appropriate procedure would be to combine the best items from both forms into a third instrument and submit this new instrument to further trial, and experimental and developmental studies.

Since the two forms of the instrument were found to be alternates of each other, it is possible to combine the items, using the item analysis of this study as the tryout of test items and as a guide in putting together a more adequate distributive education composite subject matter achievement instrument.

Recommendations

Based upon the results of this study, the following recommendations and suggestions for further study are made.
1. Further validation of the achievement instruments should be made through extension of the testing program to groups of students, geographic areas, and types of programs different from those included in this study.

2. Additional occupational validation should be completed for the achievement instruments through review and analysis of the tests by competent distributive workers and by educational measurement personnel.

3. Further studies should be conducted through combination of the best items from both forms of the achievement instrument into a third test.

4. Correlational studies should be conducted that:
   a. correlate job success with scores on the achievement instruments.
   b. correlate intelligence, aptitude, and prior achievement to scores on the marketing and distribution achievement instrument.
   c. correlate success in secondary distributive education programs with scores on the achievement instruments.
   d. correlate academic success in secondary schools with scores on the marketing and distribution achievement instrument.
4. Experimental studies should be conducted which:
   a. measure the effect of different methods of instruction on achievement as measured by the marketing and distribution achievement instrument;
   b. measure the effect of job experience on the marketing and distribution achievement test;
   c. compare the attainment of distributive education and non-distributive education students on the achievement instrument.

5. Further analysis of the instruments developed in this study should be completed through computation of:
   a. inter-item correlations within each instructional area;
   b. correlation between different sub-tests;
   c. factor scores for each sub-test to determine how different treatments affect factor scores;
   d. the reading level of the instruments to determine the effect of verbal facility on test scores.

6. Developmental efforts should be made to construct instruments and techniques for measuring the achievement of other objectives of distributive education in the cognitive, psychomotor and affective domains.
APPENDIXES
APPENDIX A

O H I O  C O O R D I N A T O R S  W H O  P A R T I C I P A T E D  I N

I N S T R U M E N T  T R I A L S
<table>
<thead>
<tr>
<th>Coordinators who participated in the trail of appraisal form</th>
<th>Coordinators who participated in the trial administration of the Achievement Instrument</th>
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APPENDIX B

OHIO COORDINATORS WHO PARTICIPATED IN

THREE STEPS OF THE ACHIEVEMENT

TESTING PROGRAM, 1967-68
OHIO COORDINATORS WHO PARTICIPATED IN
THREE STEPS OF THE ACHIEVEMENT
TESTING PROGRAM, 1967-68

Participation is coded in this manner: (1) participation in step 1, the determination of the objectives, phases, and content of
distributive education; (2) participation in step 2, the evaluation
of the achievement instrument which was developed from the content
identified under the first step; (3) participation in step 3, testing
of their senior students at the beginning and end of the 1967-68
school year.

<table>
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<tr>
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<th>Coordinator and School</th>
<th>This Person Took Part in Step(s)</th>
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<td>Gary W. Poffik Sylvania H.S. 1</td>
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<td>Robert Yates Pleasant View H.S. 1,2,3</td>
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<td>O. K. Rogers Reynoldsburg H.S. 1</td>
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APPENDIX C

DISTRIBUTIVE EDUCATION OBJECTIVES, PHASES, AND CONTENT APPRAISAL FORM
Information Section

Name __________________________ School __________________________

School address next year ____________________________________________

Type of program your school will operate in 1967-68. B  C
Other ____________________________________________________________

Type of program your school operated in 1966-67. B  C
Other ____________________________________________________________

Number of years this program will have been in operation at the end of the 1967-68 school year? ________

Number of years you will have taught at the end of the 1967-68 school year? ________

Number of years you will have been a distributive education coordinator at the end of the 1967-68 school year? ________

The type of degree you now hold? ____________________________ Major ____________

Institution from which you obtained your degree? ______________________

Are you currently enrolled in advanced degree work? ________
If yes, where and in what subject area? ___________________________

Will you cooperate in Phase two of this study by reviewing and evaluating the achievement test? ________

Will you cooperate in Phase three of this study by participating in the pretest and posttest at your school? ________

1 Type B programs cover one school year and provide at least two class periods per day of the regular schedule for vocational instruction to the cooperative group.

2 Type C programs cover one school year providing at least one class period per day of the regular schedule for vocational instruction in distribution in classes limited to the cooperative group enrolling those who have completed at least two semesters of preparatory instruction.
I. OBJECTIVES AND PROGRAM ORGANIZATION

Please indicate your agreement or lack of agreement with the objectives in statements 1-5, and phases in statement 6, by checking the block which most nearly describes your acceptance of the objective or phase as stated. If a change is needed in the wording of the objective or program phase, feel free to make that change before checking the block of your choice.

1. The main objective of distributive education in the high school is to prepare students for jobs in marketing and distribution.

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2. In carrying out this main objective, it is necessary for distributive education students to learn and acquire intellectual abilities and knowledges appropriate to marketing and distributive occupations.

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3. In carrying out this main objective, it is necessary for distributive education students to learn and acquire manipulative or motor skills appropriate to marketing and distributive occupations.

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4. In carrying out this main objective, it is necessary for distributive education students to learn and acquire interests, values and attitudes appropriate to marketing and distributive occupations.

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5. In carrying out this main objective, it is necessary for distributive education students to learn and acquire appreciations and adjustments appropriate to marketing and distributive occupations.

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6. The main phases or sections of cooperative education in distributive education are:

A. On-the-job training.

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B. Instruction in those areas or topics common to all distributive occupations.

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C. Instruction in those areas or topics applicable to the training station and the type of job in which the cooperative student is placed.

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</table>
D. Instruction and participation in the personal, social, and leadership development activities of youth programs.

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E. Write in any other objective or phase of the program not mentioned above which you feel should be included.

__________________________________________________________________

__________________________________________________________________

__________________________________________________________________
II. In this part of the appraisal form indicate, by placing your coded response in each of the black spaces provided, whether you think each of these areas should be taught to most high school students as part of the knowledges applicable to all distributive occupations. Code your response in the following way:
1=This topic should be taught,
2=I am not sure this topic should be taught,
3=This topic should probably not be taught.

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Write in any other topics you feel should be taught which were not included in the list above.
APPENDIX D

SOURCES OF DISTRIBUTIVE EDUCATION

COMPOSITE SUBJECT MATTER


"Texas Manuals." *Advanced Selling*, *Basic Organization of Distribution*, *Basic Selling*, *Communications in Distribution*, *Merchandising*, *Marketing in our Economy*, *Mathematics of Distribution*, *Retail Credit*, *Sales Promotion*, *School and Business Relationships*, *Austin: Distributive Education Service, University of Texas.*


APPENDIX E

NON-OHIO DISTRIBUTIVE EDUCATORS WHO PARTICIPATED IN THE INSTRUMENT DEVELOPMENT PHASE OF THIS STUDY
Mr. Eugene L. Dorr  
State Supervisor of Distributive Education (at the time of participation)  
Arizona State Department of Education  
Phoenix, Arizona

Mr. John E. Elias  
State Supervisor of Distributive Education  
State Department of Vocational Education  
Lincoln, Nebraska

Mary V. Marks  
Program Specialist in Distributive Education  
U.S. Office of Education  
Washington, D.C.

Ralph E. Mason  
Professor of Business and Distributive Education  
Indiana State University  
Terre Haute, Indiana

Warren G. Meyer  
Professor of Distributive Education  
University of Minnesota  
Minneapolis, Minnesota

Karl F. Powell  
City Supervisor of Distributive Education  
Milwaukee, Wisconsin

H.D. Shotwell  
State Supervisor of Business Occupations Education  
State Board For Vocational Education  
Topeka, Kansas
APPENDIX F

PRETEST ITEM ANALYSIS SUMMARY: FORM 1
# Pretest Item Analysis Summary: Form 1

(Items Converted to Posttest Numbers)

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*An asterisk following a correlation coefficient means that coefficient is significant at the .05 level of t or chi-square.

*An asterisk in the item column means that item was revised.
APPENDIX G

PRETEST ITEM ANALYSIS SUMMARY: FORM 2
### PRETEST ITEM ANALYSIS SUMMARY: FORM 2

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An asterisk following a correlation coefficient means that coefficient is significant at the .05 level of $t$, or chi-square.

An asterisk in the item column means that item was revised.
APPENDIX H

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*An asterisk following a correlation coefficient means that coefficient is significant at the .05 level of t, or chi-square.*
APPENDIX I

POSTTEST ITEM ANALYSIS SUMMARY, FORM 2
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*An asterisk following a correlation coefficient means that coefficient is significant at the .05 level of t, or chi-square.
APPENDIX J

MARKETING AND DISTRIBUTION ACHIEVEMENT

INSTRUMENT: FORM 1
MARKETING AND DISTRIBUTION TEST

Form 1

1. To be able to sell effectively a salesman should
   1. be of average height and weight.
   2. wear only finer clothes.
   3. keep quiet most of the time.
   4. know the thing he sells.
   5. be competent in all those above.

2. Customers usually buy merchandise because they
   1. need it.
   2. want to imitate others.
   3. desire approval.
   4. want comfort.
   5. value the security it provides.

3. Credit may be called
   1. capital.
   2. a bank's job.
   3. character.
   4. paying cash.
   5. a customer service.

4. When goods are trucked to a store for resale, what should
   be done first?
   1. check them.
   2. pay for them.
   3. store them.
   4. unload them.
   5. unpack them.

5. Gummed label price tickets usually would not be used on
   1. belts.
   2. leather gloves.
   3. boy's stockings.
   4. sweaters.
   5. handkerchiefs.

6. A topnotch retail salesperson
   1. uses some obvious pressure.
   2. stays close to prospects as they look around.
   3. gives his opinion about the customer's problems.
   4. shows interest in the customer.
   5. is very talkative.

7. Advertising is useful because
   1. it introduces the product.
   2. it is helpful in auditing.
   3. it makes an appeal for related merchandise.
   4. through it goods can be sold at a profit.
   5. it directs the customer.

8. On what type of sale is the customer usually asked to sign
   his name?
   1. Cash-take sale.
   2. C.O.D. sale.
   3. cash-send sale.
   4. will-call sale.
   5. all of these.

9. When a customer objects, a salesperson should probably
   1. keep quiet.
   2. suggest something else.
   3. tell him he is wrong and why.
   4. start a different approach.
   5. find out why.

10. Customers
    1. always say what they mean.
    2. like to be told what to do.
    3. usually return goods.
    4. often buy because of the service they receive.
    5. almost never need product information.
11. Cooperation is
   1. doing what is required of you.
   2. striving for recognition.
   3. struggling with others for customers.
   4. keeping quiet at all times.
   5. operating jointly with others.

12. Merchants sell on credit to
   1. improve their cash position.
   2. increase sales.
   3. decrease income tax.
   4. use up excess cash.
   5. improve their credit.

13. The main purpose of private business firms is
   1. mass distribution.
   2. to make a profit.
   3. to serve customers.
   4. civic leadership.
   5. to provide employment.

14. A city of stores is called a
   1. shopping center.
   2. mall.
   3. discount house.
   4. chain.
   5. corporation.

15. Which one of these following personality traits usually would be valuable to a salesworker?
   1. gloominess.
   2. loyalty.
   3. hostility.
   4. lack of confidence.
   5. disagreeableness.

16. One of the main advantages of being a cooperative student is that you
   1. are a full-time student.
   2. can put theory into practice.
   3. are on the job full-time.
   4. can be a job supervisor.
   5. are free from school responsibility.

17. Which one of these is not usually found on a cash register receipt?
   1. name of store.
   2. current date.
   3. amount of sale.
   4. name of the item bought.
   5. number of sale on this register.

18. The small store owner with a very small budget for advertising would probably advertise
    1. on television.
    2. through cooperative local circulars.
    3. on radio.
    4. in magazines.
    5. through catalogs.

19. Who eventually pays for advertising?
    1. The sales promotion manager.
    2. the store manager.
    3. the customer who buys the item which was advertised.
    4. the merchandise manager.
    5. the board of directors.
20. What is the "iron clad" rule in selling?
   1. never void a sales slip.
   2. give every customer a receipt.
   3. always sign receipts.
   4. never change a sales slip.
   5. never abbreviate.

21. Which one of the following is usually a good reason why some salesmen are more successful than others?
   1. age differences.
   2. physical strength.
   3. high pessimism.
   4. planning ability.
   5. cheerfulness.

22. Competition
   1. increases price differences among stores.
   2. is a system of store control.
   3. is rivalry between firms.
   4. does not affect many retailers.
   5. is cooperation between rivals.

23. One would expect the greatest price rise for a product when
   1. there is no change in supply.
   2. demand increases, supply also increases.
   3. demand increases, supply decreases.
   4. demand decreases.
   5. demand and supply decrease.

24. From the profit point of view, a salesperson should be friendly with
   1. employers.
   2. supervisors.
   3. fellow workers.
   4. customers.
   5. suppliers.

25. Which of these best describes the relations of supermarkets today?
   1. friendship and mergers.
   2. many joint undertakings.
   3. cost sharing between firms.
   4. understanding.
   5. competition.

26. Absenteeism is
   1. irregular attendance.
   2. a form of fringe benefit.
   3. tardiness.
   4. an aspect of unionism.
   5. none of these.

27. Product information is needed most by salesmen for
   1. highly advertised goods.
   2. speciality goods.
   3. shopping goods.
   4. convenience goods.
   5. variety goods.

28. Which of these terms does not belong with the others?
   1. style.
   2. attractiveness.
   3. department.
   4. comfort.
   5. price.

29. In buying merchandise for resale, the most important thing to consider would be
   1. customer wants.
   2. transportation charges.
   3. competition.
   4. space requirements.
   5. price.

30. All store displays should be
    1. symmetrical.
    2. profitable.
    3. dainty.
    4. beautiful.
    5. ornamental.
31. The purpose of parliamentary procedure for an organization is to
1. keep the members in order.
2. make interruptions with ease.
3. make it easy to conduct business.
4. affect and impress visitors.
5. to protect the rights of non-members.

32. Which of these is not a type of outdoor advertising?
1. radio.
2. posters.
3. car cards.
4. billboards.
5. neon signs.

33. A woman works 30 hours, earning $1.75 an hour. How much will she earn?
1. $50.00.
2. $47.50.
3. $52.50.
4. $45.25.
5. none of these is correct.

34. A salesperson's duties or responsibilities involve primarily
1. persuasion.
2. fulfillment.
3. satisfaction.
4. direction.
5. management.

35. A store owner discounts an item 10% to his employees. How much does he sell an $8.00 item to them for?
1. $7.20.
2. $7.00.
3. 0.
4. $8.80.
5. none of these is correct.

36. Which one of these personality traits would not usually be an asset to a worker?
1. toleration.
2. confidence.
3. agreeableness.
4. good manners.
5. suspicion.

37. The amount of money a merchant spends on advertising should be
1. a fixed amount each year.
2. based on inventory value.
3. based on a percentage of sales.
4. based on his payroll.
5. based on Fair Trade Standards.

38. Merchandise stored under a counter is called
1. display stock.
2. companion merchandise.
3. emergency stock.
4. reserve stock.
5. isolated merchandise.

39. A boy buys a bat costing $6.00. He also pays a 2½% sales tax. How much does he pay, including tax?
1. $6.15.
2. $6.25.
3. $7.50.
4. $6.03.
5. none of these is correct.

40. Marking merchandise means
1. putting prices on.
2. goods that write or make marks.
3. noting the number of goods on hand.
4. stock control.
5. pricing merchandise.
41. Which of these is a form of cash?
   1. balance sheet.
   2. money order.
   3. layaway.
   4. charge plate.
   5. all of these.

42. A selling point is a
   1. market.
   2. reason for buying.
   3. place to buy.
   4. piece of merchandise.
   5. place to sell.

43. One of these terms does not belong with the others. Which does not belong?
   1. inventory sheet.
   2. data sheet.
   3. application blank.
   4. employment test sheet.
   5. application letter.

44. Direct selling involves
   1. a middleman.
   2. an agent for the producer.
   3. producer and consumer only.
   4. a broker and a customer.
   5. a wholesaler and a retailer.

45. Suggestion selling is
   1. unnecessary.
   2. impersonal selling.
   3. extra selling.
   4. order taking.
   5. all of these.

46. Salesmanship is
   1. controlling the thinking of others.
   2. making an impression.
   3. competing with potential buyers.
   4. asking someone to buy.
   5. persuading someone to buy.

47. Which of these is called a supplementary advertising medium for retailers?
   1. newspapers.
   2. billboards.
   3. direct mail.
   4. store display.
   5. television.

48. The connections between or among persons in a business are called
   1. information.
   2. coordination.
   3. messages.
   4. scientific principles.
   5. human relations.

49. 40% of 100 equals
   1. 40.
   2. 50.
   3. 60.
   4. 40.
   5. None of these is correct.

50. "Piggybacking" in television advertising means
    1. a dealer of a product is mentioned in the advertisement.
    2. combining commercials for two different products.
    3. a small color advertisement in a black and white program.
    4. a program follows a highly rated show.
    5. prospective advertisers select highly rated programs.

51. Dividends are
    1. a refund paid to customers.
    2. a sum paid for the use of cash.
    3. profits of a proprietorship.
    4. profits of a partnership.
    5. shares of profits of a corporation.
52. A company's attitude toward customers may be shown best in their
1. newspaper advertisements.
2. employee retirement plans.
3. store front.
4. sales salaries.
5. merchandise return policies.

53. Which of these terms best describes selling as it relates to our economy?
1. useful.
2. not needed for most products.
3. possibly important.
4. usually important.
5. indispensable.

54. The director of sales promotion is in charge of
1. buying.
2. credit sales.
3. accounting for sales expenses.
4. advertising.
5. selecting fashion merchandise.

55. Goodwill for a business is the
1. customer's favorable attitudes.
2. number of customers.
3. type of business customers.
4. number of sales.
5. type of sales.

56. The salesman should never forget that he is working with
1. products.
2. intangibles.
3. customer services.
4. people.
5. selling problems.

57. Which of the following terms is similar to capitalism?
1. socialism.
2. collective economy.
3. free enterprise.
4. political system.
5. nationalism.

58. Which of the following would cause an increase demand for natural gas?
1. a greater demand for coal.
2. a reduced demand for gas stoves.
3. a large price increase for other types of heating fuel.
4. less production of heating oil.
5. none of these.

59. When giving 60¢ to a customer in change, which of these coins would you give if you had them to give?
1. six dimes.
2. twelve nickels.
3. two quarters and three nickels.
4. one fifty cent piece and one dime.
5. two quarters and one dime.

60. The job of salesman would be classified as
1. an executive job.
2. generally unnecessary.
3. essential.
4. a beginning job.
5. a supervisory job.

61. Which of these markup equations is not correct?
1. retail - cost = markup.
2. markup = retail + cost.
3. cost + markup = retail.
4. cost = retail - markup.
5. all of them.

62. A clearance key on a cash register
1. identifies salespersons.
2. registers the amount of the sale.
3. identifies the merchandise.
4. opens the cash drawer.
5. releases cash register keys.
63. Articles of merchandise which complement each other are called
   1. convenience goods.
   2. shopping goods.
   3. style goods.
   4. specialty goods.
   5. related goods.

64. The number of job openings in sales and service occupations in recent years has been
   1. increasing rapidly.
   2. increasing slowly.
   3. constant and hardly ever changes.
   4. decreasing slowly.
   5. decreasing rapidly.

65. Most product information is furnished to retailers from
   1. advertising agencies.
   2. sales consultants.
   3. merchandise suppliers.
   4. distributors.
   5. protective agencies.

66. \( \frac{1}{4} \) multiplied by 2/3 equals
   1. 3/4.
   2. 3/12.
   3. 1/6.
   4. 1/4.
   5. none of these.

68. Markup or markon of an item is 25% of cost. The item costs $5.00. The retail price of the item is
   1. $1.25.
   2. $6.25.
   3. $5.00.
   4. $11.00.
   5. not included in these choices.

69. In order to advance in a marketing job, an employee should
   1. do his present job well.
   2. learn advanced job skills.
   3. be ambitious and show initiative.
   4. be cooperative.
   5. do all of the things above.

70. 6,81 divided by 3.14 equals
   1. 21.70.
   2. 51.63.
   3. .508.
   4. 5.08.
   5. none of the above.

71. The dollar value of a store's inventory must be known in order to
   1. pay the store's debts.
   2. compute the store's profit.
   3. keep a record of credit sales.
   4. analyze expenses.
   5. keep track of sales equipment.

72. In the strict sense, which of the following is not a part of our system of marketing?
   1. wholesaler.
   2. retailer.
   3. jobber.
   4. common carrier.
   5. Federal Reserve System.
73. An action before an organization to correct disorder in proceedings is called a (an)
   1. amendment.
   2. second.
   3. adjournment.
   4. point of order.
   5. postponement.

74. Caring for stock might be called a (an)
   1. job.
   2. occupation.
   3. vocation.
   4. duty.
   5. position.

75. The interest rate on Savings Bonds is 3 3/4%. How much interest will be paid on a $400 bond?
   1. $12.
   2. $13.
   3. $412.
   4. $413.
   5. none of these.

76. One way to lose the confidence and trust of fellow workers is to
   1. be loyal to them.
   2. share your personal problems with them.
   3. be dependable.
   4. treat them as individuals.
   5. recognize that behavior is unpredictable.

77. The job of controller would be classified as
   1. an executive job.
   2. unnecessary.
   3. an entry job.
   4. a beginning job.
   5. a semi-skilled job.

78. Which of these is a textile?
   1. leather shoes.
   2. felt hats.
   3. cosmetics.
   4. photographs.
   5. necklaces.

79. Production is different from
   1. retailing.
   2. forestry.
   3. fishing.
   4. manufacturing.
   5. mining.

80. Free enterprise means
   1. you are free to work or not to work as you please.
   2. you are free to buy or not to buy.
   3. you are free to sell or not to sell.
   4. all of these apply.
   5. none of these is correct.

81. A W-2 Federal tax form is a (an)
   1. withholding tax statement.
   2. income tax return.
   3. social security card.
   4. application for a social security card.
   5. exemption certificate.

82. What would probably be the best way for a worker to learn all about a job?
   1. observe someone doing it.
   2. ask questions of the Labor Department.
   3. ask questions of the worker.
   4. do it yourself under supervision.
   5. ask questions of the worker's employer.
83. If a customer asks for an item which is not in stock, the salesperson should
1. say he is sorry and invite the customer to come in again.
2. inform the customer of the reason the item is not in stock.
3. show some alternate merchandise.
4. suggest the customer buy elsewhere.
5. say "We don't stock that item."

84. Independent stores are
1. the newest type of store.
2. the most common type of store.
3. called corporations.
4. usually department stores.
5. supermarkets.

85. The principal purpose of advertising is
1. increased profit.
2. distribution.
3. increased sales.
4. expense reduction.
5. customer satisfaction.

86. A layaway sale is a type of
1. credit sale.
2. will-take sale.
3. cash sale.
4. C.O.D. sale.
5. sale on approval.

87. A salesman should know
1. himself first.
2. the product or service he offers.
3. customer motivation.
4. his employer's policies.
5. all of these above.

88. Consumption deals primarily with
1. production.
2. resources.
3. finished products.
4. trade schools.
5. transportation.

89. The Federal Social Security tax rate
1. changes through Congressional action only.
2. never changes.
3. is 2% of taxable income.
4. changes every year.
5. none of these is correct.

90. The fashion cycle is best described by which one of these groups of terms?
1. exclusiveness, fad, vogue.
2. period, era, age.
3. styling, planning, buying.
4. model, elite, developments.
5. acceptance, popularity, decline.

91. An air-conditioner costs $250. To this is added a $10 installation charge and a $2 tax. How much will be paid for the air-conditioner including tax and the installation?
1. $291.62.
2. $306.62.
3. $356.25.
4. $281.25.
5. none of these.
92. A decrease in the amount of merchandise on hand due to theft, breakage, and failure to record sales is called
1. mark-down.
2. stock shrinkage.
3. loss leaders.
4. unit loss.
5. dollar control.

93. A financial statement showing the value of a business at a specific time is a (an)
1. inventory sheet.
2. profit and loss statement.
3. salesbook.
4. cash book.
5. balance sheet.

94. The sales approach "Have you been waited on?" can be described as a (an)
1. merchandise approach.
2. formal approach.
3. informal approach.
4. ineffective approach.
5. recognition approach.

95. Show cards are a kind of
1. point of purchase promotion.
2. demonstration.
3. fashion show.
4. special offer.
5. sales contest.

96. Which of the following comes closest to the meaning of the term "division of labor?"
1. unionism.
2. corporation officers.
3. competition.
4. assembly line technique.
5. open markets.

97. Book inventory is the same as
1. an inventory tag.
2. perpetual inventory.
3. the selling price of merchandise.
4. sales records.
5. the cost price of merchandise.

98. "Drive time" is an expression used by which of the following advertising media?
1. radio.
2. newspapers.
3. outdoor.
4. television.
5. magazines.

99. To be successful a retail salesperson must have the ability to
1. get along with others.
2. use words correctly.
3. make use of arithmetic skills.
4. check numbers and names correctly.
5. all of these.

100. In purchasing merchandise for resale, "dating" refers to the
1. length of time sellers extend credit.
2. length of the marketing period.
3. length of the selling season.
4. practice of using commercial credit.
5. selection of the best method of shipping.
APPENDIX K

MARKETING AND DISTRIBUTION ACHIEVEMENT

INSTRUMENT: FORM 2
1. The main reason for learning your job well is that
   1. you can make more money today.
   2. you can learn how to avoid responsibility.
   3. it makes you a good supervisor.
   4. it makes your job less tiresome.
   5. it provides a basis for future job advancement.

2. To be effective, a salesperson must
   1. have been a cashier.
   2. be very thoughtful.
   3. be very intelligent.
   4. understand customers.
   5. have gone to a community college.

3. The price on a girls' blouse would probably be marked with a (an)
   1. string ticket.
   2. clip ticket.
   3. ink stamp.
   4. sew on ticket.
   5. pin ticket.

4. A D.E. student would hear about more distributive jobs
   1. in an employment agency.
   2. from the AFL-CIO.
   3. on a bulletin board.
   4. in a newspaper.
   5. on television.

5. Merchandise is
   1. the person who sells goods.
   2. a reason for buying.
   3. a selling point.
   4. the person who buys goods.
   5. the goods offered for sale.

6. A sales event would be a (an)
   1. pre-inventory sale.
   2. anniversary sale.
   3. annual clearance.
   4. end-of-the-month sale.
   5. all of the above.

7. The profit level for most retail firms is
   1. 1-10% of sales.
   2. 10-20% of sales.
   3. 20-30% of sales.
   4. 30-40% of sales.
   5. over 40% of sales.

8. "Drive time" is an expression used by which of the following advertising media?
   1. newspapers.
   2. outdoor.
   3. radio.
   4. television.
   5. magazines.

9. Before granting credit to a customer, the most important thing a merchant will consider is the customer's
   1. marketing background.
   2. bill paying record.
   3. family status.
   4. future plans.
   5. higher education record.

10. From the profit point of view, a salesperson should be friendly with
    1. employers.
    2. supervisors.
    3. customers.
    4. competitors.
    5. suppliers.
11. An advantage of working for yourself might be
   1. little or no capital needed.
   2. regular hours.
   3. freedom of action.
   4. no involvement in management.
   5. few responsibilities.

12. In which of the following sales occupations are fewer and fewer workers employed each year?
   1. wholesale salesmen.
   2. industrial salesmen.
   3. retail salespersons.
   4. salesmen for financial and service firms.
   5. auctioneers.

13. To be successful a retail salesperson must have the ability to
   1. get along with others.
   2. use words correctly.
   3. make use of arithmetic skills.
   4. check numbers and names correctly.
   5. be competent in all of these.

14. Which of these qualities of personality is of least importance on the job?
   1. honesty.
   2. beauty.
   3. open-mindedness.
   4. teamwork.
   5. thoughtfulness.

15. Personal selling is best described as
   1. persuasion.
   2. peddling.
   3. marketing.
   4. bartering.
   5. canvassing.

16. If a customer says "We've had trouble with that brand," what should the salesperson do?
   1. ignore the statement.
   2. tell her it won't happen again.
   3. find out why.
   4. call her attention to a more expensive brand.
   5. call her attention to a less expensive brand.

17. Only one of these personality traits would be valuable to a salesworker. Which one is it?
   1. aggressiveness.
   2. hostility.
   3. lack of confidence.
   4. loyalty.
   5. shyness.

18. A topnotch retail salesperson
   1. uses some obvious pressure.
   2. shows interest in the customer.
   3. stays close to prospects as they look around.
   4. gives his opinion about the customer's problems.
   5. is talkative.

19. Which of the following could not be called a customer shopping convenience?
   1. a lost and found desk.
   2. the first aid station.
   3. an employee's lounge.
   4. the parking lot.
   5. rest rooms.

20. Customers usually buy merchandise because they
   1. need it or want it.
   2. want to imitate others.
   3. are proud.
   4. desire to make a profit.
   5. want trading stamps.
21. To the customer the style of an article of merchandise is a basic need, involves social approval, involves economy, is an excuse for buying, satisfies her curiosity.

22. Production begins with finished products, trade schools, raw materials, home economics, transportation.

23. Which of these following terms best describes personality?
   1. education.
   2. reading ability.
   3. speech.
   4. behavior.
   5. appearance.

24. Customers always say what they mean, like to be told what to do, often buy because of the service they receive, never return goods, almost never need product information.

25. Suggestion selling is order taking, impersonal selling, not important, extra selling, none of these.

26. Placing fresher bread to the rear and older bread to the front of a display case is called the principle of circulation, division, arrangement, accumulation, rotation.

27. A check is a form of 1. credit. 2. endorsement. 3. money order. 4. money. 5. bank draft.

28. Merchandise versatility means 1. attractiveness. 2. comfort. 3. low price. 4. adaptability. 5. dependability.

29. Which of the following is usually a good reason why some salespersons are more successful than others?
   1. age differences.
   2. physical strength.
   3. better planning ability.
   4. cheerfulness.
   5. high optimism.

30. The salesman should never forget that he is working with 1. products. 2. intangibles. 3. customer services. 4. people. 5. selling problems.

31. For a salesperson, most merchandise information will probably come from 1. television advertisements. 2. manufacturers. 3. asking the customer. 4. meditation. 5. the government.

32. Physical inventory involves 1. memorization. 2. changing. 3. selling. 4. counting. 5. buying.
33. Which one of the following personality traits would not usually be an asset to a worker?
1. tolerance.
2. confidence.
3. suspicion.
4. agreeableness.
5. curiosity.

34. An advantage for the customer of buying on credit instead of cash would be
1. credit prices are lower than cash prices.
2. it is quicker than cash.
3. the service charge.
4. it is less expensive than cash.
5. the credit rating the customer receives.

35. Which of these helps a store keep records straight and avoid sales errors?
1. want slips.
2. inventory sheets.
3. general journals.
4. check books.
5. sales receipts.

36. An employee works 40 hours at $2.25 an hour. How much is his gross pay?
1. $80.
2. $85.
3. $100.
4. $82.50.
5. none of these is correct.

37. A middleman usually
1. makes things.
2. mines things.
3. grows things.
4. sells things.
5. finds things.

38. The connections between or among persons in a business are called?
1. information.
2. coordination.
3. messages.
4. a science.
5. human relations.

39. "Piggybacking" in television advertising means
1. a dealer of the product is mentioned in the advertisement.
2. a small color ad in a black and white show.
3. combining commercials for two different products.
4. a program follows a highly rated show.
5. prospective advertisers choose highly rated programs.

40. In the U.S. most local advertising dollars are spent through the medium of
1. radio.
2. magazines.
3. direct mail.
4. television.
5. newspapers.

41. The salesman can best prepare his sales presentation by
1. memorizing a sales talk.
2. studying his product.
3. getting a good night's sleep.
4. having several funny stories ready.
5. gathering information about his store.
42. Wrapping or sacking is an important part of selling because it
   1. provides employment.
   2. is always so well done.
   3. gives the salesman a chance to talk to the customer.
   4. permits ease of carrying.
   5. none of these.

43. Which of these persons would be in charge of display?
   1. sales promotion director.
   2. salesman.
   3. buyer.
   4. controller.
   5. merchandise manager.

44. Unit control is an inventory system recorded in terms of
   1. dollar value.
   2. memory.
   3. the number of merchandise items.
   4. observation.
   5. cash value.

45. The number of job openings in sales and service occupations in recent years has been
   1. increasing very slowly.
   2. increasing rapidly.
   3. constant and hardly changing.
   4. decreasing slightly.
   5. decreasing rapidly.

46. The American economic system is
   1. capitalistic.
   2. communistic.
   3. socialistic.
   4. autocratic.
   5. feudalistic.

47. To the job applicant the personal interview is
   1. not to be taken seriously.
   2. a sales situation.
   3. a necessary evil.
   4. a buying situation.
   5. a contest.

48. If a customer asks for an item which is not in stock, the salesperson probably should
   1. say he is sorry and ask the customer to come in again.
   2. inform the customer of the reason the item is not in stock.
   3. suggest the customer buy at another store.
   4. show some similar merchandise.
   5. say "We don't stock that item."

49. $\frac{1}{2}$ minus $\frac{1}{8}$ equals
   1. $\frac{3}{4}$.
   2. $\frac{1}{8}$.
   3. $\frac{1}{4}$.
   4. $\frac{3}{8}$.
   5. none of these is correct.

50. Parliamentary procedure is used
   1. in filing reports.
   2. in conducting meetings.
   3. only by officers.
   4. only by members.
   5. in dealing with non-members.

51. Who eventually pays for nation-wide newspaper advertising?
   1. the local store.
   2. the nation-wide company.
   3. the store's board of directors.
   4. the customer of the product advertised.
   5. both the local store and the nation-wide company.
52. The network of firms through which consumers obtain merchandise is called
1. mass production.
2. a manufacturer's agency.
3. an assembler's cooperative.
4. a channel of distribution.
5. a consumer's union.

53. Which of the following terms is similar to capitalism?
1. socialism.
2. communism.
3. feudalism.
4. free enterprise.
5. politicalism.

54. A presentation of an action or a policy before an organization is called a (an)
1. amendment.
2. motion.
3. point of order.
4. adjournment.
5. postponement.

55. A publicity or advertising division is concerned with
1. personal selling.
2. buying.
3. bookkeeping.
4. impersonal selling.
5. controlling the firm.

56. An increased supply of a product at the same time the demand remains the same usually brings about a
1. higher price for the product.
2. decrease in purchasing power.
3. higher price for a substitute.
4. lower price for a substitute.
5. lower price for the product.

57. A good way for a manufacturer to introduce a small inexpensive new product would be to
1. offer sales contests.
2. use direct sales.
3. give premiums to dealers.
4. attach coupons to the product.
5. give away samples to consumers.

58. The customer's cash register receipt usually contains all but one of these. Which one is not on the receipt?
1. the current date.
2. cumulative sales total.
3. the kind of sale.
4. the name of the item bought.
5. the salesperson's identification.

59. The markup (or markon) equation is
1. retail + markdown = cost.
2. retail - markdown = cost.
3. markdown + markup = cost.
4. cost + markup = retail.
5. cost + markdown = retail.

60. An organization which sets standards for advertising is
1. Printer's Ink, Inc.
2. The U.S. Department of the Interior.
4. Good Housekeeping.
5. Advertising Age.

61. Which of the following is not a textile?
1. silk stockings.
2. rayon dresses.
3. felt hats.
4. leather gloves.
5. braided cotton rugs.
62. The sales tax is $2\frac{3}{4}$% on an item costing $15. How much should be paid for the item, including tax?  
1. $15.  
2. $16.30.  
3. $15.38.  
4. $18.80.  
5. None of these is correct.

63. A store owned by its customers is a (an)  
1. mail order house.  
2. consumer cooperative.  
3. partnership.  
4. independent store.  
5. supermarket.

64. Retail price refers to  
1. the selling price of the merchandise to the customer.  
2. the cost of the goods to the store.  
3. the billed cost to the store.  
4. markdown on purchases.  
5. markup (or markon) on purchases.

65. Which of the following is not a service type of business?  
1. variety store.  
2. dry cleaners.  
3. advertising agency.  
4. insurance agency.  
5. real estate agency.

66. Trading stamps are a method of  
1. promoting sales.  
2. burning off excess profits.  
3. increasing customer services.  
4. decreasing competition.  
5. decreasing overhead expenses.

67. A dealer marks up an item 20% of his cost. The item costs $6.00. What is the retail price of the item?  
1. $6.00.  
2. $7.20.  
3. $13.20.  
4. $12.00.  
5. None of these is correct.

68. A bank pays 4\frac{3}{4}% per annum on $600. How much interest will be paid?  
1. $27.  
2. $24.  
3. $624.  
4. $30.  
5. None of these is correct.

69. The device which disengages keys pressed in error on the cash register is called the  
1. release key.  
2. clearance lever.  
3. key reversal.  
4. control bar.  
5. motor bar.

70. A salesperson should usually dress  
1. as he sees fit.  
2. in a manner which will attract the customer's attention.  
3. in a very conservative manner.  
4. as is customary in the store.  
5. as a fashion leader.

71. A good way to lose the confidence and trust of others is to  
1. be loyal to them.  
2. be dependable.  
3. treat them as individuals.  
4. share your personal problems with them.  
5. recognize that behavior is unpredictable.
72. When giving a customer 85¢ in change, which of these coins should you give him, if you had them?
   1. three quarters and two nickels.
   2. three quarters and two dimes.
   3. three quarters and one dime.
   4. three quarters, one dime, one nickel.
   5. one fifty cent piece, one quarter and one dime.

73. The agreement between the students, the employer, and the D.E. instructor for job training is called a
   1. report card.
   2. rating sheet.
   3. training memorandum.
   4. rotational schedule.
   5. promotion sheet.

74. 41.6 divided by 2.08 equals
   1. 200.
   2. 1.86.
   3. 20.
   4. 500.
   5. none of these is correct.

75. The aim of marketing is
   1. transportation.
   2. consumption.
   3. storage.
   4. economy.
   5. production.

76. Which of these terms does not belong with the others?
   1. drop shippers.
   2. commission merchants.
   3. price tickets.
   4. market representatives.
   5. rack jobbers.

77. Sales resistance is often
   1. imaginary.
   2. overcome.
   3. caused by the weather.
   4. a desire for information.
   5. a nuisance.

78. Perpetual inventory is the same as
   1. an inventory tag.
   2. the cost price of goods.
   3. book inventory.
   4. the selling price of goods.
   5. sales records.

79. An advertisement's layout is best described as a (an)
   1. matrix.
   2. blueprint.
   3. white space.
   4. logotype.
   5. printed page.

80. A loss-leader is used to
   1. compute profit.
   2. reduce store expenses.
   3. set store policy.
   4. increase office space.
   5. attract customers.

81. An example of an asset to a store would be
   1. expenses.
   2. the store's debts.
   3. profit.
   4. cash.
   5. none of these.

82. Merchandise on the sales counter would be called
   1. reserve stock.
   2. on order stock.
   3. forward stock.
   4. none of these.
   5. all of these.
83. Which of these parliamentary motions does not need a second for consideration?
   1. a point of order.
   2. an amendment to a motion.
   3. to adjourn.
   4. to fix the time for the next meeting.
   5. to postpone action.

84. A store receives an invoice for $100 dated June 16 and bearing the terms 6/10, E.O.M. Before what date must the invoice be paid to receive the discount?
   2. June 30.

85. One way to close a sale is to
   1. find out the customer's objections.
   2. ask the customer's opinion.
   3. suggest a related item also.
   4. analyze the customer.
   5. stress the price.

86. "Point-of-purchase advertising" is a term used instead of the word
   1. cashiering.
   2. retailing.
   3. media.
   4. display.
   5. prospecting.

87. Getting along with others usually involves problem solving. Which one of the following is not one of the traditional four steps in problem solving?
   1. weight and decide.
   2. determine possible solutions.
   3. get the facts.
   4. state the problem.
   5. try out the solution.

88. Usually products
   1. sell themselves.
   2. have to be sold in some way.
   3. are sold by salesmen.
   4. are hard to sell.
   5. are self service items.

89. Most of the jobs in retail stores involve
   1. working with things only.
   2. frequent criticisms.
   3. forcefully showing your eagerness.
   4. general friction with customers.
   5. the ability to work with others.

90. Which type of advertising is a catalog?
   1. indirect.
   2. assembly.
   3. outdoor.
   4. novelty.
   5. direct.

91. The job of receiving clerk would be classified as a (an)
   1. executive job.
   2. beginning job.
   3. supervisory job.
   4. managerial job.
   5. all of these.
92. In checking merchandise, checking goods against the invoice is called
   1. inventory count.
   2. direct or open check.
   3. blind check.
   4. pre-check.
   5. post-check.

93. The modern chain store was begun by
   1. the A & P Company.
   2. automotive dealers.
   4. the yankee peddler.
   5. F.W. Woolworth.

94. What percent of all business firms in existence today are small stores that have only one or a few owners?
   1. 98%.
   2. 15%.
   3. 25%.
   4. 85%.
   5. 50%.

95. A single fixed retail price at which all goods falling in a certain class will sell is known as a
   1. odd pricing.
   2. price range.
   3. control price.
   4. closed price.
   5. price line.

96. A high school student-learner is a (an)
   1. apprentice.
   2. beginning worker.
   3. employer.
   4. full-time student.
   5. part-time employee.

97. The newspaper ad whose object is to sell "the store" rather than specific merchandise is called a (an)
   1. promotional ad.
   2. institutional ad.
   3. classified ad.
   4. display ad.
   5. cooperative ad.

98. The most important value of window or interior display is in
   1. the arrangement.
   2. the selling power.
   3. the color scheme.
   4. the appeal.
   5. all of these.

99. Sales returns and allowances were 7% of gross sales for a furniture store. If the store had net sales of $93,000 for the year, how much sales returns and allowances were there for the year?
   1. $7,000.
   2. $13,286.
   3. $10,000.
   4. $6,510.
   5. none of these is correct.

100. An occupation is a
    1. listing of duties.
    2. task.
    3. type of job.
    4. group of positions.
    5. group of similar jobs.
APPENDIX L

FORMULAS USED IN THIS STUDY
1. Item Difficulty

Item difficulty is found by dividing the total number answering the item correctly by the total number taking the test.

2. Phi-Coefficient

\[ \phi = \frac{ab - cd}{pq p'q'} \]

Where:
- \( a \) is the ratio of the upper percent answering the item correctly to the total number in the two percentage groups.
- \( b \) is the ratio of the lower group answering the item incorrectly to the total number in the two groups.
- \( c \) is the ratio of the upper group answering the item incorrectly to the total number in the two groups.
- \( d \) is the ratio of the lower group answering the item correctly to the total number in the two groups.

\[ p = a + d \]
\[ q = c + b \]
\[ p' = a + c \]
\[ q' = d + b \]

3. Item Discrimination

\[ \text{No. of wrong responses in Lower } \% \text{ - No. wrong in Upper } \% \]
\[ \text{Total no. in either Upper or Lower } \% \]

4. Point Biserial \( r \) Coefficient

\[ r_{pbis} = \frac{M_p - M_t}{s} \cdot \sqrt{p/q} \]

Where:
- \( M_p \) is the mean test score of those getting the item correct.
- \( M_t \) is the mean test score of the total group.
- \( p \) is the number of students answering the item correctly.
- \( q \) is the number answering incorrectly.
- \( s \) is the standard deviation.
5. Mean Score

The mean score for a given group (Upper, Lower, or Total) is the sum of scores of the group divided by the total number in this group.

6. Median Score

\[ MD = L + i(N/2 - F)/f \]

Where

- \( L \) is the lower limit of the Median interval
- \( i \) is the length of the Median interval
- \( f \) is the frequency for the Median interval
- \( F \) is the cumulative frequency for all intervals below the Median interval
- \( N \) is the total number of persons taking the test

7. Standard Deviation

\[ s = \sqrt{\frac{N \sum x^2 - (\sum x)^2}{N(N-1)}} \]

Where

- \( s \) is the standard deviation of the test
- \( x \) is the individual score
- \( N \) is the total number of persons taking the test

8. Reliability Coefficients

a. Kuder-Richardson formula \#20

\[ r_{tt} = \frac{k}{k-1} \left[ 1 - \frac{\sum p \cdot q}{s^2} \right] \]

Where

- \( r_{tt} \) is the estimate of reliability
- \( k \) is the number of items in the test
- \( s \) is the standard deviation of the test
- \( p \) is the proportion passing a particular item
- \( q \) is the proportion failing the same item
b. Kuder-Richardson formula # 21

\[ r_{tt} = \frac{k}{k-1} \left[ 1 - \frac{\bar{x} - k}{s^2} \right] \]

Where \( \bar{x} \) is the mean score of the group, other symbols have the same meaning as in a. above.

c. Odd-Even Split

\[ r_{tt} = \frac{N\sum \tilde{o} \cdot E - (\sum \tilde{o}) \cdot (\sum E)}{\sqrt{[N\sum \tilde{o}^2 - (\sum \tilde{o})^2] \cdot [N\sum E^2 - (\sum E)^2]}} \]

Where \( \tilde{o} \) is the odd-number score

\( E \) is the even number score

\( N \) is the number of pairs of scores

This correlation yields a relationship between two tests of \( \frac{1}{2} \) the length of the true test and is corrected for attenuation by the Spearman-Brown prophecy formula:

\[ r = \frac{2 r_{tt}}{1 + r_{tt}} \]

9. Standard Error

For each of the above reliability coefficients, a standard error was computed according to the following formula:

\[ SE_{rr} = s \sqrt{1 - r} \]

Where \( s \) is the standard deviation

\( r \) is the appropriate reliability coefficient
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