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NEWNAM, CAROL STAINBACK: Development of an Evaluation Device to Accompany a Self-Instructional Program on the Teaching of Generalizations and Cyclic Individual Testing and Revision of the Program. (1967) Directed by: Dr. Hildegard Johnson. pp. 63.

The purposes of this study were to develop an evaluation device to accompany a self-instructional program on the teaching of generalizations and to administer the same program to individual subjects for the purpose of revising the program.

The evaluation device was based on the objectives of the program, "Teaching Home Economics Students to Generalize Their Learnings", by Dr. Hildegard Johnson. Test situations constructed were similar to situations in the program in which the subject was guided to plan and make decisions consistent with current ideas about how students learn to generalize. Two tests, one to be used as a pre-test and the other as a post-test, were developed using parallel structure. The tests were sent to five universities where 156 students, who were majoring in home economics education and enrolled in a home economics methods course, responded to the evaluation device. Each test was scored using an answer key. The answer key was developed based on the responses of three members of the home economics education staff at the University of North Carolina at Greensboro. Each staff member had responded to the program. A Kuder-Richardson test of reliability and an item analyses were computed for the device.

The first draft of the program was administered to nine home economics education majors at the University of North Carolina at Greensboro. One at a time the subjects read the program making comments and asking questions about the content of the program. These remarks were recorded and used in the revision of the program after each subject had completed

the program. The subject's path through the program and the time spent on each chapter were also recorded. Other information, concerning the use of correct responses in an appendix for the subject's use and concerning their personal feelings about the program, was obtained.

As the study progressed it was found more desirable to combine the equivalent forms of the evaluation device into one device, because their measures of reliability were low. The combined device has a relatively low measure of reliability of .57. The distribution of test scores was relatively high, indicating that the device was too easy for the group. The lowest and highest test scores were thirty and fifty-five. The maximum score on the test was sixty. The mean score was forty-three. The median score interval was forty-two to forty-three with 61 percent scoring forty-two or above. The mode was the score interval forty to forty-one with twenty-seven subjects scoring in this interval. The standard deviation was 4.71. The discriminating power varied from -.16 to .67.

As a result of the information collected from subjects who responded to the program, revisions were made by the author, Dr. Johnson. The average time spent reading the program was four hours and thirty-two minutes. The opinions of the subjects toward this method of learning were favorable, and they thought they were beginning to grasp the concept of teaching for generalizations. The subjects indicated that the instructor administering the program should check their responses to the program, and the answers should be in the appendix for the subject's use. The subjects also indicated that there were occasions when they wanted to check their own work.

Edgar Johnson

APPROVAL SHEET
This thesis has been approved by the following committee
of the Faculty of the Graduate School at The University of North
Carolina

**DEVELOPMENT OF AN EVALUATION DEVICE TO ACCOMPANY
A SELF-INSTRUCTIONAL PROGRAM ON THE TEACHING OF
GENERALIZATIONS AND CYCLIC INDIVIDUAL TESTING
AND REVISION OF THE PROGRAM**

by
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A Thesis Submitted to
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The University of North Carolina at Greensboro
in Partial Fulfillment
of the Requirements for the Degree
Master of Science in Home Economics

April 22, 1967
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Approved by
Hildegarda Johnson
Director

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The main task of education is to prepare the student for situations he encounters in life. For education to be worthwhile there must be a transfer of learning from the school situation to the real life situation.

One way to achieve this transfer is for students to be taught to generalize. For the student teacher, teaching students to generalize is a difficult kind of teaching. The student teacher is too concerned with classroom management, preparation of lesson plans, and other necessary student teaching activities to see her primary role of guiding students to the transfer of learning to real life situations.

Failure of student teachers to teach generalizations could stem from their vague understanding of exactly what generalizations are. The student teacher may know the definition and types of generalizations as given by various authors; however, she may lack the understanding necessary for planning lessons which guide the student to learn and apply generalizations.

One of the first problems a student teacher encounters is the selection of generalizations from curriculum guides. Frequently they are stated in a formal way that cannot be applied or taught to students without rewording or simplification. The student teacher may, in this case, try to teach the generalization in the form in which it appeared in the curriculum guide. An example of a generalization that needs rewording before it is taught is: "Intensive use of credit requires moral responsi-

CHAPTER I

INTRODUCTION

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ibility and an awareness of the sources and costs of credit available in the money market place." (19, p.211)

Another problem the student teacher has is providing suitable and abundant learning experiences so that the generalization will have meaning to the student. When the learning experiences are so inadequate that the student is not able to form a desired generalization, the student teacher may tell the student what the generalization is. Besides depriving the student of the learning experience of forming generalizations independently, the generalization handed the student may not fit his level of understanding. If the student fails to form the generalization himself, learning is not likely to be transferred to real life situations and the task of education has not been accomplished.

As one solution to the problem of student teachers' inadequacies to guide students to generalize their learnings, Johnson (19) wrote the first draft of a self-instructional program. The program was designed to teach students in home economics methods courses to guide pupils to generalize their learnings. While Johnson was writing the program, "Teaching Home Economics Students to Generalize Their Learnings," the present study was conducted. The study involved developing an evaluation device to accompany the program and administering the program individually to home economics education majors for the purpose of revising it.

The self-instructional program, by Johnson (19), is an intrinsic program concerned with one method of teaching for the formation of generalizations in high school home economics classes. This program offers the student the following experiences:

1. Distinguishing between statements and generalizations.

2. Restating generalizations in words a pupil might use.
3. Sub-dividing generalizations which are too broad to teach at one time.
4. Composing generalizations from the pupil's own mind.
5. Restating objectives to indicate the terminal behavior of the pupil.
6. Stating generalizations that correspond to specific objectives.
7. Planning two lessons in which generalizations are taught inductively and deductively.

This program, intended for use in a home economics education methods course, will provide the student with practical learning experiences not found in textbooks and references commonly used in home economics methods courses.

Design of the Study

The purposes of the present study were as follows:

1. To develop an evaluation device to be used as a pre-test and post-test accompanying the self-instructional program by Johnson. (19)
2. To administer individually the first draft of the same program for the purpose of making revisions.

The first purpose was accomplished by writing items for the test, then administering the test to home economics education majors in five colleges. Such a test usually accompanies a program. The test was designed to measure attainment of the objectives of the program specified by Johnson. (Appendix A) The test was developed independently from the

program, rather than copying questions from the program.

The second purpose was accomplished by cyclic individual testing of the first draft of the program with nine home economics education majors at the University of North Carolina at Greensboro. On the basis of this testing, suggestions for revision of the program were made.

Definitions

Concept: mental images of ideas, objects or procedures.

Generalization: "...statement supported by facts, beliefs, and/or experiences which can be applied in a number of situations." (14, p.4)

Self-instructional program: a text which "takes the place of a tutor for the student, and leads him through a set of specified behaviors designed and sequenced to make it more probable that he will behave in a given desired way in the future." (8, p.1)

Intrinsic program: a program..."characterized by relatively lengthy items, multiple-choice responses, and consistent use of branching." (7, p.273)

Reliability: "...the accuracy (consistency and stability) of measurement by a test." (5, p.25)

Item difficulty: the percentage of testees who respond correctly.

The importance of teaching students to think and to formulate generalizations was recognized as early as 1894. A note of this date from the publisher of a visual aid for teaching numbers and arithmetic was found in a school house in Redwood, California. The note stated that the visual aid material

... will enable you (the teacher) to give the student a comprehensive view of the subject. Never teach the child rules; rather lead him to think for himself and formulate principles from his own reasoning... Draw out original ideas and ask for varied illustrative explanations of them. In showing him that he is never called upon to do anything for which there is not a satisfactory explanation, you develop in him a taste for the subject, make it interesting to him and pleasant for yourself. (14, first page)

CHAPTER II

REVIEW OF LITERATURE

This review of literature is concerned with how to teach generalizations so that students form and apply them in everyday living. Although this review is concentrated on teaching for generalizations, teaching for concept formation is so closely related that the two cannot be completely separated.

The terms "concepts" and "generalizations" are widely used by curriculum planners. A conference was held at French Lick, Indiana, July 24 - 28, 1961, for the purpose of stating concepts and generalizations in home economics. Since this conference there has been much emphasis on defining and stating concepts and generalizations. Little has been written about how the teacher plans her lessons so that students can discover concepts and generalizations or apply them in everyday life.

The importance of teaching students to think and to formulate generalizations was recognized as early as 1894. A note of this date from the publisher of a visual aid for teaching numbers and arithmetic was found in a school house in Redwood, California. The note stated that the visual aid material

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Thinking is the process by which students form generalizations. It is important, therefore, to consider ways of stimulating students to think. Burton, Kimball, and Wing (2) made several suggestions for stimulating creative thought. They suggested that the teacher first consider the level of maturity, experience, readiness, and interest of the student; starting the process of thinking at the point where the student is. The teacher should provide opportunities for the student to express himself spontaneously. The student's ideas should be received with expectancy and encouragement. Making negative comments, laughing at a student's first attempt, or comparing him with standards beyond his level, discourage creative expressions by the student.

Burton, et. al. (2) also emphasized that when a teacher is guiding the student's process of thought, she should remember that occasions for thinking must be real to the student and deal with his purposes. Imposed or isolated situations are not effective. Varied experiences are more effective than repetitive experiences. The teacher must also keep in mind that students have differences in their background experiences and will, therefore, achieve different levels of thinking. These differences must be expected and accepted. The teacher can assist the thinking process by asking thought questions, suggesting alternatives, calling attention to factors unnoticed, and placing emphasis on the understanding of relationships rather than specific facts. Giving students the opportunity to read, observe, and question will produce thinking.

Guiding a student to think is essential in the process of guiding the student to generalize. Stratemeyer, McKim and Sweet stated:

Only as facts are seen in relationship, only as individuals think

about and generalize from their experience, are understandings developed that are useful beyond the immediate situation in which they are learned.(21)

These authors emphasized that interrelating facts and drawing generalizations from them lead to transfer of learnings to new situations. The learner arrives at generalizations as he is helped to use and broaden them in a variety of experiences. One experience may be used to guide students to form several generalizations, and one generalization may be applied in a variety of experiences.

Brownell and Hendrickson (1) emphasized the importance of making learning vital and functional for the student. Learning will be vital and functional for the student when generalizations are acquired. Implications for teaching for the formation of generalizations are summarized as follows:

1. All the generalizations the student will need for life can not be taught in the school.
2. The teaching of generalizations consists of guidance in problem solving.
3. The first step in teaching generalizations, and the most difficult to manage, is to make sure that the student sees the problem in what is to be learned.
4. Varied types of learning experiences must be provided.
5. Teaching students to think can best be done by giving them many verbal problems and leaving them to their own devices.
6. The generalizations taught should be full of meaning and suitable for later use.

7. The teacher should not seek merely to maintain generalizations. Rather she should provide experiences that will lead to a continuous extension and enrichment of the generalizations.

One of the main reasons for teaching for the formation of generalizations is the belief that they carry over more effectively into the student's everyday life. According to Williamson and Lyle (10) this transfer depends on how well the student can relate the generalization to the new situation. The student may know the generalization and not realize that it will apply to another situation. Transfer takes place more easily when the learning situation is much like the situation the learner will be faced with in real life. Therefore teaching situations must be like home and life situations. One of the suggestions made for teaching foods was having students prepare meals instead of individual foods. Other suggestions were to teach social customs in connection with actual social events, to teach child development through actual experience with children, to use equipment in laboratories which is similar to what the student has at home, and to solve problems similar to those the student has in everyday life.

Spitze (17) stated that when teaching generalizations, teachers should find a way to relate the generalization being taught to a problem that is real to the student. The student can then be guided to think through the problem, "seeing the relationship expressed in the generalizations as a necessary part of her data, or as an understanding resulting from the experience of solving the problem." (17, p. F-50) The probability of the student's remembering and using the generalizations varies with the method of teaching. The method she considered best led the student to

think from the known to the unknown.

Spitze emphasized that creating many experiences, in which the student arrives at a conclusion through a process of thinking, is necessary if students are to learn to think. To do this, the teacher should develop her lessons around the behavior she wishes her students to achieve rather than around separate units of subject content. For example, if the teacher wanted her student to be able to "purchase consumer goods and services appropriate to an over all consumption plan and wise use of economic resources"(17, p.F-120), she should plan the content of her lessons around units of clothing, foods, equipment, and grooming, since students would be purchasing goods related to each of these areas.

For learning experiences to be meaningful to the student, the learning experiences must be organized. Dressel (3) gave three criteria for organizing learning experiences. The criteria were continuity, sequence, and integration. Learnings from earlier experiences must be used in later experiences so that there will be continuity from one learning experience to another. The sequence of learning experiences should be cumulative, building upon the previous ones. Finally, these experiences should be related to experiences in other disciplines, other courses, and other experiences outside the classroom.

According to Spitze (16) generalizations should be stated before a teacher begins to teach and should be used to organize the thinking and planning of lessons. She recommended that the teacher begin with broad generalizations at the beginning of the year and break these into smaller generalizations at the beginning of each unit. The broad generalizations would emerge as learning experiences proceeded.

Just as planning for generalizations in the home economics program is an important part of teaching, planning for the evaluation of student progress in applying these generalizations is important. Spitze emphasized that evaluation items should be consistent with the generalizations emphasized during the learning process. She used the following example:

If we are trying to teach the generalization that "Keeping a record of past expenditures can help one in planning for future purchases", then we would not use a test item that asked what percentage of a family's income should be spent for various family needs. We might instead show such a record and ask whether it seemed feasible for the record keeper to plan for a given purchase during the following month and why. (16, p.33)

A written test is not always the best way to evaluate whether or not a generalization has been learned. One should observe the student as he has an opportunity to apply the generalization in his everyday experience. For example, a generalization about nutrition may be evaluated as the student chooses his food in the cafeteria line.

At a curriculum workshop on clothing and textiles at Washington State University (22) several guides for helping students develop and apply generalizations were given. They have been summarized as follows:

1. After planning the generalizations to be learned, use questions to stimulate and guide thinking in the direction of the generalizations.
2. Provide learning experiences that will require the use of basic underlying facts and principles.
3. Lead students to point out differences and similarities among observations related to the generalization and to begin drawing conclusions.

4. Ask students to state conclusions orally or by writing complete sentences.
5. Accept the kind of statements of generalizations that students are ready to make.
6. If students have misconceptions, plan and present additional experiences to clarify the concept or generalization.
7. Provide experience in applying the generalization to new situations.

The most specific suggestions for teaching generalizations in home economics at the high school level were given by Osborn.(14) She said that if it is assumed that the purpose of education is to help students develop understandings which can be applied in everyday life, then it is most important that teachers help students identify and recognize the relationships among ideas which lead to the formation of accurate generalizations. When the teacher knows how well students understand certain ideas, she can provide opportunities for experiences that will help each student find greater meaning. The student's understanding of ideas will increase as his experiences related to them are more numerous and more complete.

Osborn pointed out that concepts and generalizations cannot be taught directly because this would mean that students would merely memorize definitions. Instead, classroom experiences should be planned in such a way that each student thinks about the basic ideas involved, sees the relationships, and makes application to her own behavior and understanding.

When planning to teach a generalization, Osborn said that the generalization should be at the level expected of students learning to state generalizations rather than at an abstract level of thinking. Students

seldom use the same form and exact words that the teacher uses when she originally states the generalization in planning. The teacher must be flexible and accept the generalization as it is stated by the student. Generalizations are not easy to form; but as students are given the chance to practice stating generalizations, they will gain skill in stating them clearly. The teacher must also remember that she cannot form generalizations for the student. If a student forms a false generalization or has some misconception, it cannot be corrected by stating it correctly for her. It isn't the stating of the generalization that is wrong, it is the understanding the student has that needs correcting. This can only be corrected by reteaching.

The procedure Osborn recommended for teaching for the formation of generalizations was as follows:

1. Identify the objectives.
2. Write generalizations related to the objective.
3. Identify the basic ideas used in the generalizations.
4. Locate information on the ideas and their relationships.
5. Plan learning experiences to help the student see relationships among the ideas and to state generalizations in his own words.

The types of learning activities suggested were comparing, pointing out differences, and analyzing results. To help the student synthesize his ideas and understandings, the teacher should form summarizing questions which direct the student in stating generalizations.

Osborn summarized her ideas for teaching generalizations in the following six guidelines:

1. After selecting concepts, guide the thinking of students through asking questions; guide the students to locate, interpret and evaluate supporting facts; use a variety of experiences.
2. Lead students to point out the differences and similarities among the factors in a situation and to begin to draw conclusions.
3. Ask students to state conclusions orally or in writing of complete sentences. This enables the teacher to discover mistaken ideas and reteach if necessary. These first conclusions should be tentative since generalizations must be based on many experiences.
4. If students have misconceptions, plan and present additional experiences to clarify the concepts.
5. Ask for conclusions of students and accept the kind of statements that students are ready to make.
6. Plan further experiences in applying the generalizations. (17, p.12)

Questioning the student is one technique used to stimulate student thinking and formation of generalizations. The following is a list of types of questions (23) which can be used to guide students to develop generalizations following a learning experience:

1. Questions for which the answer will be found in the previous learning experience.
2. Questions calling for an examination of similar ideas in other situations.
3. Questions asking students to draw their own inferences, to examine cause and effect relationships, to express their ideas verbally.
4. Questions asking students to form a generalization of what they have just seen, read, heard, or experienced.
5. Questions asking students to examine their formulated generalization as they apply it to present day life.

6. Questions asking what authorities say about the topic.
7. Questions asking students to illustrate what their generalization means.

What a student learns is influenced by how he learns. The student can obtain generalizations by the teacher stating the generalization, and then explaining and demonstrating the generalization through a variety of experiences. However, the most meaningful way a student can learn is by discovering ideas on his own. Dale (13) stated that learning by discovery calls for thinking and creativity by both the teacher and the student. The idea of students learning by themselves is implied also in what Spencer wrote in 1873:

...in education, the process of self-development should be encouraged to the fullest extent. Children should be led to make their own investigations, and to draw their own inferences. They should be told as little as possible, and induced to discover as much as possible. (13, p.1)

Dale (13) recommended that the teacher be less concerned with the right and wrong answers to questions, but be more concerned about how the student thinks as he answers questions. Students should have experiences which test their powers to make judgments. Too often students will start recalling facts instead of thinking about the relationships among facts when they are asked a question.

Summary

To summarize the ideas of the authors mentioned in this review of literature, the following generalizations were formed. These generalizations can be used as guides when teaching for the formation of generalizations.

I. Readiness of the student.

- A. The teacher must use the student's level of maturity, experience, readiness, and interest as a starting point for teaching a generalization. (2)
- B. The student must have an adequate background to have success in forming generalizations. (1)

II. Phrasing the generalization.

- A. Generalizations taught should be full of meaning and suitable for later use. (1)
- B. Generalizations should be stated by the teacher and used as a guide in planning lessons. (17)
- C. The student's statement of the generalization must be accepted at the student's level of understanding and as it is stated in his own words. (14)

III. Learning experiences.

- A. The formation of generalizations is a step-wise, gradual process. Therefore, learning experiences should be planned so that generalizations are acquired gradually. (1)
- B. Experiences and situations used in the classroom must be real to the student and deal with his everyday life experiences. (2)
- C. Transfer of generalizations to new situations takes place more readily when the learning situation is much like the student's real life situation. (10)

- D. Classroom experiences should be planned in such a way that each student thinks about the basic ideas involved, sees the relationships, and makes application to his own behavior and understanding. (22)
- E. Generalizations are formed by solving problems. (1)
- F. Learning experiences should require the use of basic underlying facts. (22)
- G. Students must be given the opportunity to read, observe, and question. (2)
- H. Experience should test the students' powers to make judgments. (13)
- I. Opportunities must be given for the student to express himself spontaneously. (2)

IV. Forming Generalizations.

- A. Generalizations should not be given to the student; he should form them for himself. (1)
- B. Generalizations are formed by thinking. (2)
- C. Students can be motivated to form generalizations by the teacher asking thought questions, suggesting alternatives, calling attention to facts unnoticed, and placing emphasis on the understanding of relationships rather than specific facts. (2)
- D. Students should be led to point out differences and similarities among observations related to the generalization and to begin to draw conclusions. (14 and 22)

- E. Misconceptions must be clarified by reteaching, not by giving the student the correct idea. (22)
- V. Using a generalization in a new situation.
 - A. Students must be helped to use and broaden generalizations in a variety of experiences. (21)
 - B. Generalizations must be used in later experiences, building upon the old generalization. (3)
- VI. Evaluating the formation of generalizations.
 - A. Evaluation items must be consistent with the generalization emphasized during the learning process. (17)
 - B. Evaluation of generalizations is best when the teacher observes the student as he has an opportunity to apply the generalization. (17)

Construction of the Evaluation Device

The evaluation device for the self-instructional program was based on the objectives of the program. An effort was made to construct a test item for each objective. Throughout the test, the subject was required to put herself in the position of a teacher who is teaching home economics, and who is faced with the problem of how to plan and teach the content of the various units in the high school curriculum. Test situations were constructed similar to situations in the program which guided the subject

CHAPTER III

PROCEDURE

The objectives of this study were to develop an evaluation device to be used with the self-instructional program, "Teaching Home Economics Students to Generalize Their Learnings", and to administer individually the first draft of the same program for the purpose of making revisions. The procedures used to accomplish each objective will be described separately.

Development of The Evaluation Device

The evaluation device was to be an objective paper and pencil test designed to measure attainment of the objectives of the self-instructional program. (Appendix A) The test was to be appraised by empirically testing it with a sample of subjects from the target population and computing a measure of reliability and item analyses.

Construction of the Evaluation Device

The evaluation device for the self-instructional program was based on the objectives of the program. An effort was made to construct a test item for each objective. Throughout the test, the subject was required to put herself in the position of a teacher who is teaching home economics, and who is faced with the problem of how to plan and teach the content of the various units in the high school curriculum. Test situations were constructed similar to situations in the program which guided the subject

to plan and make decisions consistent with current ideas about how students learn to generalize.

No effort was made to measure validity of the test. Rather, the test was constructed in such a way that content validity would be evident. Items were based strictly on the objectives of the program, and it was the purpose of the instrument to measure the extent to which the subject had attained these same objectives by responding to the program.

Two tests, one to be used as a pre-test and the other as a post-test, were developed using parallel structure. Since the equivalent forms of the tests were relatively short, it seemed that it would be feasible to have the subjects in the test sample respond to both of the tests. Items of the tests were therefore combined to form one test. (Appendix B) Later the tests were to be separated for item analyses. An answer sheet was prepared to accompany the test. (Appendix C)

Subjects

The 156 subjects who took the test were home economics education majors in five universities. Each was enrolled in a methods course in home economics education. This methods course was either their first, second, third, or fourth course in methods of teaching home economics. It was the first course for 102 subjects, the second for 51, and the third or fourth for 3. The school and number of subjects participating in the study were as follows:

<u>Name of School</u>	<u>Number of Subjects</u>
Iowa State University	46
Kansas State University	45
University of North Carolina at Greensboro	35
University of Tennessee	11
South Dakota State University	19

Administering the Test

Permission to have the test administered was obtained from the instructor of the methods course in each of the universities participating in the study. The evaluation devices and answer sheets were sent to the appropriate university accompanied by a letter of explanation to the instructor who would administer the test to her class.

Developing the Answer Key

A separate answer key for the equivalent forms was developed, based on the responses of members of the home economics education staff at the University of North Carolina at Greensboro. Three staff members, who had responded to the program, took the test. The answer chosen for an item was considered correct if all three, or two out of three, agreed upon the same answer.

Treatment of Data

When the tests were returned, each was scored as two tests. From the compiled test scores the Kuder-Richardson test of reliability and item analyses were computed for each of the equivalent forms.

Test of Reliability

A Kuder-Richardson formula for reliability independent of any particular split of items was used. The following formula was used:

$$r_{xx} = \frac{m}{m-1} \left(1 - \frac{(Np_i)(Nq_i)}{N(N-1)s_x^2} \right)$$

N = number of individuals taking the test.

m = number of items in the test.

p_i = proportion of individuals answering the i th item correctly.

Np_i = number of individuals answering the i th item correctly.

$q_i = 1 - p_i$ = proportion of individuals not answering the i th item correctly.

Nq_i = number of individuals not answering the i th item correctly.

s_x^2 = variance of the test scores of the N individuals if each score is the number of items answered correctly by the individual. (19, p.311)

Item Analyses

Item difficulty and item discriminating power for each of the thirty test items in both the pre-test and post-test were computed. Each group of test papers was divided into three groups: the upper 27 percent, the middle 46 percent, and the lower 27 percent. Only the upper and lower 27 percent were used to determine the item discriminating power, and these will be referred to as the upper and lower group. Flanagan's table for calculating correlation coefficients using the upper and lower 27 percent of test scores was used to determine the discrimination index for each item. (4) The percent of the upper group answering the particular item correctly and the percent in the total group answering the item were calculated. These percentages were entered in Flanagan's 27 percent table to obtain the product moment correlation coefficient corresponding to the proportions of correct answers in the 27 percent scoring highest and lowest.

Item difficulty was determined by counting the total number answering the item correctly and dividing this number by the total number answering the item.

Cyclic Individual Testing of The Program

"Teaching Home Economics Students to Generalize Their Learnings" is an intrinsic self-instructional program. A correct response allowed the subject to proceed directly through the main line in the program. An incorrect response branched the subject to supplementary materials designed to clear up the misconceptions. Choosing correct responses gave her a shorter path through the program.

Nine subjects at the University of North Carolina at Greensboro, who were home economics education majors and currently enrolled in "Curriculum and Teaching Methods in Home Economics", were selected for the individual testing of the program. Subjects majoring in home economics education were selected because they were typical of the target population for whom the program was written.

Each subject read the program making comments and asking questions when she was confused about the content, when she was getting bored or tired, and when she thought there were too many physical distractions. The subject was encouraged to make comments about the program. Her path through the program, depending upon responses made to multiple choice questions, was recorded on a prepared chart. When the subject asked a question or made a comment, the page she was reading and the question or comment were recorded. The time the subject spent on each chapter was recorded also.

After each subject had completed the program, her comments, questions, and path through the program were studied by the author of the program and the researcher. Revisions in the program were made, clearing up any misconceptions and re-phrasing parts of the program that were not clear to the subject. The next subject went through the revised program and a second revision was made. Each of the nine subjects was treated in this same test-revision-test cycle until few questions and comments were made.

The first eight subjects were given the following instructions:

The self-instructional program you are about to read is to be used as part of a course for teaching home economics teachers to help their students generalize their learnings. We need your help in the revision of the program. I will hand you one page at a time for you to read. Try to answer the questions and carry out the assignments. Here is a folder with some scratch paper for you to write down your responses and assignments. I will sit here with you as you go through the program. Please feel free to make comments and ask questions.

The ninth subject was treated the same as the first eight except that she was not handed a page at a time. She was given the entire program to read through, turning the pages herself when she was ready for them. This was done to see if the subject objected to skipping around in the text. The instructions to this subject were:

The self-instructional program you are about to read is to be used as part of a course for teaching home economics teachers to help their students generalize their learnings. We need your help in the revision of the program. You will be given the complete program to read. When you read a page where you must choose an answer followed by a page number, write down the page number of the answer you choose. Try to answer the questions and carry out the assignments. Here is a folder with some scratch paper for you to write down your responses and assignments. I will sit here with you as you go through the program. Please feel free to make comments and ask questions.

This self-instructional program was different from the usual intrinsic program. At various intervals the subject was asked to write assignments which were to be turned in to the instructor. After each subject completed the program she was asked:

Suppose you took this program in a methods class. Would you rather have the teacher check your answers or have the answers in an appendix so you could check them yourself without the teacher seeing them?

Opinions were used as a basis for deciding whether to print examples of answers in an appendix for the subject's reference or to print them in an instructor's manual for the instructor's reference.

Two open-end statements, designed to elicit a true response concerning feelings about the program, were asked at the end of the subject's work on the program. The questions were:

1. Before I read this program, I felt that when I went to do my student-teaching I...
2. Now that I have read this program I feel that I ...

DISTRIBUTION OF TEST SCORES

CHAPTER IV

Score Interval	Frequency	Cumulative Frequency	Percentile Rank
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FINDINGS

The findings of this study are discussed in two sections. The first part is concerned with the results of the administration of the evaluation device, and the second part is concerned with the information gained from the individual administration of the program.

Evaluation Device

Measure of Reliability

To determine the reliability of the equivalent forms of the evaluation device, a measure of reliability was computed. The coefficients of reliability computed, using a Kuder-Richardson formula, were .37 and .39 respectively. These coefficients indicated a very low reliability. One reason for this low reliability was the small number of test items. For this reason, the two tests were combined to form one test. The coefficient of reliability for the combined test was .57, which is still low. The small amount of variability in scores is another factor causing the reliability of the test to be low.

Description of the Distribution

The following description of scores is based on the raw scores of 156 subjects taking the test. (Appendix D)

TABLE I
DISTRIBUTION OF TEST SCORES

Score Interval	Frequency	Cumulative Frequency	Percentile Rank
54-55	2	156	100
52-53	3	154	99
50-51	8	151	97
48-49	19	143	92
46-47	14	124	80
44-45	24	110	70
42-43	25	86	55
40-41	27	61	39
38-39	16	34	25
36-37	9	18	11
34-35	7	9	6
32-33	1	2	1
30-31	1	1	1

The lowest and highest test scores were thirty and fifty-five, giving a range of twenty-six points. The maximum score on the test was sixty. The small amount of variability in scores is another factor causing the reliability of the test to be low.

The mean score was forty-three. The median score interval was forty-two to forty-three with 61 percent scoring forty-two or above. The mode was the score interval forty to forty-one with twenty-seven subjects scoring in this interval. The standard deviation was 4.71.

Item Analyses

The item analyses consisted of difficulty and discriminating power of each item. Difficulty is expressed as the proportion of students who correctly answered an item. The discriminating power expressed how well the item distinguished between the upper and lower groups of testees. Item analyses for each test item are reported in Table II.

TABLE II
ITEM ANALYSES OF CORRECT RESPONSES

Item No.	Total No. ¹	Difficulty	Upper 27% ²		Lower 27% ³		Discriminating Power
			No.	Percent	No.	Percent	
1	129	.83	33	.78	35	.84	.09
2	72	.46	30	.71	17	.40	.32
3	75	.48	31	.74	17	.40	.35
4	119	.76	38	.90	25	.60	.40
5	73	.47	33	.78	17	.40	.39
6	141	.90	40	.95	34	.81	.30
7	119	.76	37	.88	29	.69	.27
8	95	.61	36	.86	20	.48	.43
9	86	.55	33	.78	13	.31	.47
10	145	.93	42	1.00	26	.62	.67

¹The number in the total group is 156.

²The total number in the Upper 27% group is 42.

³The total number in the Lower 27% group is 42.

TABLE II (continued)

Item No.	Total No.	Difficulty	Upper 27%		Lower 27%		Discriminating Power
			No.	Percent	No.	Percent	
11	127	.81	38	.90	27	.64	.36
12	107	.68	39	.93	21	.50	.53
13	95	.61	32	.76	22	.52	.26
14	70	.45	23	.55	19	.45	.10
15	155	.99	42	1.00	41	.98	.11
16	144	.92	40	.95	41	.98	.16
17	142	.91	36	.86	36	.86	.00
18	132	.85	37	.88	36	.86	.06
19	155	.99	42	1.00	42	1.00	.00
20	133	.85	39	.93	33	.78	.28
21	152	.97	41	.98	39	.93	.23
22	106	.68	36	.86	26	.62	.31
23	155	.99	41	.98	41	.98	.00
24	155	.93	42	1.00	41	.98	.11
25	155	.93	42	1.00	40	.95	.11
26	143	.92	39	.93	35	.84	.19
27	86	.85	27	.64	18	.43	.22
28	147	.94	41	.98	38	.90	.30
29	148	.95	41	.98	38	.90	.30
30	122	.78	37	.88	26	.62	.34
31	79	.51	24	.57	19	.45	.12

TABLE II (continued)

Item No.	Total No.	Difficulty	Upper 27%		Lower 27%		Discriminating Power
			No.	Percent	No.	Percent	
32	125	.80	40	.95	28	.67	.45
33	140	.90	39	.93	33	.78	.28
34	154	.99	41	.98	40	.95	.16
35	115	.74	32	.76	29	.69	.09
36	130	.83	34	.81	34	.81	.00
37	122	.78	35	.84	27	.64	.25
38	120	.77	40	.95	25	.60	.51
39	149	.96	40	.95	38	.90	.14
40	149	.48	28	.67	18	.43	.25
41	72	.46	26	.62	16	.38	.24
42	70	.45	29	.69	6	.14	.56
43	90	.58	33	.78	16	.38	.41
44	84	.54	34	.81	15	.36	.46
45	93	.60	38	.90	11	.26	.65
46	150	.96	41	.98	39	.93	.23
47	149	.96	39	.93	39	.93	.00
48	129	.83	41	.98	34	.81	.44
49	78	.50	22	.52	19	.45	-.07
50	56	.36	21	.50	12	.28	.23
51	125	.80	38	.90	26	.62	.38
52	81	.52	32	.76	17	.40	.39

TABLE II (continued)

Item No.	Total No.	Difficulty	Upper 27%		Lower 27%		Discriminating Power
			No.	Percent	No.	Percent	
53	62	.40	15	.36	20	.48	-.12
54	69	.44	17	.40	19	.45	-.05
55	57	.36	20	.48	8	.19	.32
56	96	.62	29	.69	18	.43	.27
57	117	.75	39	.93	21	.50	.53
58	86	.55	44	.81	14	.33	.49
59	50	.32	16	.38	12	.28	.11
60	110	.70	34	.81	23	.55	.30

According to Wood (11, p.37) the difficulty of items in a test should vary from .15 to .85 with an average difficulty level of .50. The range of difficulty of items in the evaluation device of this study was .32 to .90 with an average difficulty of .72. This indicates that the items were too easy.

Generally, items with a negative or low item discriminating power are poor test items. There were four items with a negative discriminating power and nine items with a discriminating power below .10, leaving forty-seven items with a discriminating power above .10. Item discriminating power varied from -.16 to .67

Recommendations for Revision of the Evaluation Device

As indicated in the findings, there are several factors which call for revision of the evaluation device. These factors are a test with a low reliability of .57, one too easy for the subjects taking the test and too many items with negative or low discriminating power. The following recommendations are made in an effort to increase the reliability of the device:

1. Increase the length of the test to seventy-five items. The test is now sixty items long and takes approximately forty-five minutes to administer. A test of seventy-five items should take sixty minutes to administer.
2. Administer the test to a heterogeneous group in order to have a wider range of scores. The 156 students taking the test had from one to four courses in methods of teaching home economics. Some of the students should have been students who were majoring in home economics education, yet had not taken any courses in methods of teaching home economics.
3. Regulate the test conditions so that they are the same for all students. The only restriction for the testing situation was that the students be home economics education majors with some experience in a home economics education methods course. The test should be given on the same day and at the same time. A time limit of one hour (or one class period) should be given. No additional explanation of terms used in the test should be given by the administrator.

4. Items in the test should be either all dichotomous, all multiple choice, or dichotomous and multiple choice in separate groupings.

Individual items in the evaluation device should be changed or omitted in order to increase the item difficulty and item discriminating power. The following recommendations are made concerning individual items. The reader may wish to refer to Appendix B as each item is discussed.

1. Items with negative discriminating power.

- a. Replace item one with a generalization which is harder to distinguish from a statement which is not a generalization.
- b. Leave item sixteen as it is. This is an objective of the program and needs to be tested.
- c. Leave items fifty-three and fifty-four as they are, but change the directions to section XIII. This is a difficult section because there are innumerable ways to teach for the formation of generalizations, and the creative student may think of ways to teach which were not considered when the answer key was written. However, the idea of teaching inductively and deductively is an objective of the program and therefore needs to be tested. The directions to section XIII could be improved by changing them to read as follows:

XIII. Each of the following sentences is a generalization.
Classify each as generalizations which

- A) can only be taught deductively
- B) can only be taught inductively
- C) can be taught inductively or deductively

It is possible that the above change would result in a positive

item discrimination value for items fifty-three and fifty-four.

2. Items with .00 to .10 discriminating power.
 - a. Items seventeen and eighteen are relatively easy items, because both can be answered by recognizing the concepts present in the statements and deciding which statement expresses the relationship between the concepts. Although it is an easy item, the student needs to think through this type of item. No change is recommended.
 - b. Items nineteen, twenty-three and twenty-four should be reworded so that the words differ from the words used in the broad generalization.
 - c. Item thirty-five has a discriminating power of .09. Even though this is low, the researcher feels that this item should not be omitted or changed.
 - d. The difficulty of items thirty-six and forty-seven can be improved by substituting an alternative which is incorrect yet likely to be chosen.
 - e. Item forty-nine is in section XIII, which has been discussed under items with negative discriminating power.

With these recommendations for increasing the difficulty of various items and with the addition of fifteen items, it is possible that the test would be more reliable. Measures of reliability are usually based on scores of subjects sampled from a population which has been exposed to the subject matter covered in the test. Subjects outside such a population have no basis for making responses other than guessing.

Since the self-instructional program differs from the content of many methods courses, the correct population in this case would be a population of students who had responded to the program. Such a sample of suitable size for use in computing a measure of reliability was unavailable. The researcher believes that the test may be more reliable than the coefficient of reliability indicates.

Cyclic Individual Testing of the Program

As each subject read and responded to the program, the page numbers the subject chose, the subject comments, and the time spent on each chapter were recorded. At the conclusion of the program, the written responses to the program and two open-end statements plus the subject's opinion about having the correct answers in the appendix of the program were collected.

Path, Chart, Comments, and Questions

The path each of the nine students took through the program was recorded on a prepared chart. The chart indicated the page each student chose as she read through the program. Each student's path, comments, and questions were used by the author of the program to revise the program so that the subjects in the future would not make the same errors.

Time Record

A time record was kept for each subject. An average was computed for each chapter and for the total program. The time records and averages are recorded in Table III.

TABLE III

TIME RECORD
(Minutes)

Student	Chapters								Total
	1	2	3	4	5	6	7	8	
A	007	006	047	030	054	040	007	083	273
B	004	005	041	027	080	055	005	060	277
C	003	006	041	027	069	044	005	050	245
D	003	007	042	023	059	043	007	073	257
E	006	006	060	035	085	048	015	107	362
F	005	004	036	021	038	024	006	066	200
G	007	006	048	028	060	032	010	091	282
H	004	006	038	020	037	038	012	091	246
I	007	006	050	027	053	043	020	099	305
Average	005	006	045	026	059	041	010	080	272

The purpose of recording the time was to establish points where the program might be divided for one hour to one and one-half hour lessons or assignments. According to the average time on each chapter, the divisions would be after chapters three, five, seven, and eight. It took an average of fifty-six minutes to complete chapters one, two, and three; one hour and twenty-four minutes to complete chapter four and five; fifty-one minutes to complete chapters six and seven; and one hour and twenty minutes to complete chapter eight. It took an average of four hours and thirty-two minutes to complete the entire program.

Open-end Statements

The subjects' written responses to the open-end statements have been recorded, with no attempt to be selective, as follows.

Open-end statement: Before I read this program, I felt that when I went to do my student-teaching, I...

would be very unsure about myself and my ability to plan and teach a lesson.

was totally unprepared as to how to teach my students.

had no idea where to begin.

might feel more insecure about how to plan my lessons and gain the interest of my students.

wouldn't know what to do or how to handle the class.

might not be able to get things across in a manner satisfactory to me.

would have lesson plans that were too vague and general.

did not feel well enough equipped in the methods and techniques of making lesson plans and actually teaching for an enriching learning experience.

would be quite apprehensive as to how to go about making plans for teaching.

didn't know exactly what was expected as to planning teaching methods.

wondered how I would be able to sort out from the vast amount of material available, what I should and should not stress.

Open-end statement: Now that I have read this program, I feel that I ...

have gained a lot of valuable teaching methods.

now realize that much planning must be done in order to be a good teacher.

am a little more secure and not quite as apprehensive about making lesson plans.

now have a general idea as to how to break large groups of information into smaller sections which may be more easily taught and understood by high school students.

am better equipped to make generalizations and state objectives in my own mind. Although I am still unsure, I feel that I am better able to recognize the facts which make a good generalization.

at least have a foundation on which to build.

am better prepared to teach interesting lessons and can more easily plan them.

will be better able to cope with the generalizations after reading them in curriculum guides.

am much better prepared to face a class. At least I am not afraid of the term "lesson plan". I realize it is just to help me help my students.

Several other comments were made specifically about the program and this method of learning. These comments are recorded as follows:

I never realized that I was learning.

I feel like I have learned something without setting down and trying to memorize facts.

Much of what I have learned seems to have just "come" as a result of carrying out the program.

All my questions aren't removed by any means.

The program has made me straighten my ideas into workable goals.

Subject Opinions

Each subject was asked orally upon completion of the program, "If you took this program in a methods class, would you rather have the instructor check your answers or have the answers in an appendix so you could check them yourself, without the instructor seeing them?" It was the consensus that a little of both was needed. The instructor might need to give extra help in areas where the subject was weak or misunder-

stood the program. The subjects also indicated that there were occasions when they wanted to check their own work.

Recommendations for Program Revision

The following recommendations for program revision are based on incorrect responses and comments made by the subjects.

1. Subjects need more help in stating behavioral objectives. A class lesson needs to accompany this section so that students could have more experience in recognizing and stating behavioral objectives.
2. Subjects chose an incorrect answer on page 78 of the text where they were asked how many times students apply the generalization during a certain learning experience. This page should be deleted or a different question asked at the conclusion of the page.
3. On page 178, subjects were asked where in the lesson plan the teacher used an observation to lead students to discover a generalization. The subject may be merely guessing. A brief review of the lesson plan should be assigned.
4. On page 183, the subject is asked to supply an observation from the lesson plan. This section needs additional explanation.

Recommendations for Use of the Program

The program is designed to be read as an assignment in a home economics methods class. There needs to be more experience for the

student to acquire the skills presented in the program. After each assignment, the material should be discussed and practiced in class. More illustrations and problems can be given as class work. This should also be a time for the teacher to correct misconceptions. For effective use of the program, the teacher needs a reference of answers and additional learning experiences.

The purposes of this study were to develop an evaluation device to accompany a self-instructional program on the teaching of generalizations and to administer the same program to individual students for the purpose of revising the program.

Evaluation Device

An evaluation device was developed to accompany the self-instructional program, "Teaching How Economists' Students to Generalize Their Learning," by Johnson. (19) The evaluation device was based on the objectives of the program. Throughout the device, the subject was required to put himself in the position of a teacher who is teaching how economists at the secondary level. Test situations were constructed similar to situations in the program, which guided the subject to plan and make decisions consistent with current ideas about how students learn to generalize. Two tests, one to be used as a pre-test and the other as a post-test, were developed using parallel structure. The tests were sent to five universities where 135 subjects, who were enrolling in home economics education and enrolled in a home economics methods course, responded to the items in the evaluation device. When the tests were returned, each test had scored using an answer key based on the responses of three

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The purposes of this study were to develop an evaluation device to accompany a self-instructional program on the teaching of generalizations and to administer the same program to individual students for the purpose of revising the program.

Evaluation Device

An evaluation device was developed to accompany the self-instructional program, "Teaching Home Economics Students to Generalize Their Learning," by Johnson. (19) The evaluation device was based on the objectives of the program. Throughout the device, the subject was required to put herself in the position of a teacher who is teaching home economics at the secondary level. Test situations were constructed similar to situations in the program, which guided the subject to plan and make decisions consistent with current ideas about how students learn to generalize. Two tests, one to be used as a pre-test and the other as a post-test, were developed using parallel structure. The tests were sent to five universities where 156 subjects, who were majoring in home economics education and enrolled in a home economics methods course, responded to the items in the evaluation device. When the tests were returned, each was hand scored using an answer key based on the responses of three

members of the home economics education staff at the University of North Carolina at Greensboro. Each staff member had responded to the program. A Kuder-Richardson test of reliability (9) was computed for the tests. Correct and incorrect responses to items were tallied and item difficulty computed. The upper and lower 27 percent of the test papers were selected for computing item discriminating power using Flanagan's table of correlation coefficients.(4)

Cyclic Individual Testing of the Program

The first draft of the program was administered individually to nine home economics education majors at the University of North Carolina at Greensboro. The program was an intrinsic self-instructional program in which the subject was asked to complete several written assignments.

Each subject read the program making comments and asking questions about the content of the program. These remarks were recorded and used by the author in the revision of the program after each subject had completed the program. The subject's path through the program and the time spent on each chapter were also recorded. After each subject had completed the program she was asked whether she would rather have the instructor check her assignments or have the correct responses in an appendix so she could check them without the teacher seeing her answers. These opinions were used as a basis for deciding whether to print examples of acceptable responses in an appendix or to print them in a teacher's manual. Two open-end statements designed to elicit a true response concerning feelings about the program were asked. These questions were:

1. Before I read this program, I felt that when I went to do my student teaching, I ...
2. Now that I have read this program, I feel that I ...

Conclusions

Evaluation Device

As the study progressed it was found more desirable to combine the equivalent forms into one test, because their measures of reliability were low. The combined evaluation device had a relatively low measure of reliability of .57. The distribution of test scores was relatively high, indicating that the device was too easy for the group. The item analyses pointed out individual items which were too easy or lacked discriminating power. Suggestions for improving these items were made.

Cyclic Individual Testing of the Program

As a result of the information collected from individuals who responded to the program, revisions were made by the author. There are still several sections of the program which need revising. These areas are indicated in Chapter IV, Findings.

Subjects opinions toward this method of learning (i.e. program instruction) were favorable, and subjects thought they were beginning to grasp the concept of teaching for generalizations.

Recommendations

Specific recommendations concerning revision of the evaluation device and the program have been made in Chapter IV. In general, it was

recommended that the test be lengthened, that the test be given to a more heterogeneous group under the same conditions, and that like items in the test be grouped. The program should provide a deeper background in areas where there was misunderstanding by the subjects.

Recommendations for Further Study

The recommendations for further study are as follows:

1. Administer the revised evaluation device and compute a measure of reliability and item analyses.
2. Develop an evaluation device to measure the student's ability to teach for the formation of generalizations during her student teaching experience.
3. Administer the program to a home economics methods class, making additional revisions where necessary.
4. Develop classroom learning experiences to accompany the program.
5. Develop an instructor's reference of acceptable responses to assignments given in the program.

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APPENDIX A

OBJECTIVES FOR THE PROGRAM ON HOW TO TEACH PUPILS TO APPLY GENERALIZATIONS

I. Stating and selecting generalizations

- 1. Given a list of statements which are generalizations and statements which are not generalizations, the teacher discriminates between these.
- 2. Given a generalization stated in a formal way, the teacher re-states the generalization in his own words and in words a pupil might use.
- 3. Given a generalization which is so broad that several class sessions would be used to teach the generalization, the teacher states sub-generalizations which may be taught separately and later synthesized to again form the broader generalization.
- 4. Given two concepts which are related, the teacher expresses this relationship as a generalization.

II. Selecting generalizations appropriate for teaching objectives

- 1. Given an objective from a home economics curriculum guide, the student re-states the objective, applying the criteria in Mager for statement of objectives.
- 2. Given an objective stated as a terminal behavior, the teacher states generalizations, the application of which will help the student to achieve the objective.
- 3. Given objectives and generalizations as they are stated in curricula guides and in other references, the teacher
 - a. re-states the objectives to meet Mager's criteria
 - b. re-states the generalizations as taught in this program, as in Chapter 3, and selects the generalizations which are helpful in the attainment of each objective.

III. Teaching deductively

- 1. Given a generalization for which a deductive teaching sequence is appropriate, the teacher
 - a. verbalizes real life situations in which the generalization may be applied by students
 - b. plans classroom learning experiences in which students are guided to consciously apply the generalization a number of times

APPENDIX

APPENDIX A

OBJECTIVES FOR THE PROGRAM ON HOW TO TEACH
PUPILS TO APPLY GENERALIZATIONS

I. Stating and selecting generalizations

1. Given a list of statements which are generalizations and statements which are not generalizations, the teacher discriminates between these.
2. Given a generalization stated in a formal way, the teacher re-states the generalization in his own words and in words a pupil might use.
3. Given a generalization which is so broad that several class sessions would be used to teach the generalization, the teacher states sub-generalizations which may be taught separately and later synthesized to again form the broader generalization.
4. Given two concepts which are related, the teacher expresses this relationship as a generalization.

II. Selecting generalizations appropriate for teaching objectives

1. Given an objective from a home economics curriculum guide, the student re-states the objective, applying the criteria in Mager for statement of objectives.
2. Given an objective stated as a terminal behavior, the teacher states generalizations, the application of which will help the student to achieve the objective.
3. Given objectives and generalizations as they are stated in curriculum guides and in other references, the teacher
 - a. re-states the objectives to meet Mager's criteria
 - b. re-states the generalizations as taught in this program, Chapter 3, and selects the generalizations which are helpful in the attainment of each objective.

III. Teaching deductively

1. Given a generalization for which a deductive teaching sequence is appropriate, the teacher
 - a. verbalizes real life situations in which the generalization may be applied by students
 - b. plans classroom learning experiences in which students are guided to consciously apply the generalization a number of times.

- c. plans questions which will guide the students to state the generalization in their own words
 - d. plans a way for students to respond to the questions
 - e. guides the students to verbalize further applications of the generalization in situations they meet outside the classroom.
2. Given a class of pupils who have had one or two classroom learning experiences in which a generalization was applied, the teacher plans an assignment which would contribute to pupil ability to apply the generalization.

IV. Teaching inductively

1. Given a generalization and several situations in which the generalization may be applied, the teacher plans
- a. a series of classroom learning experiences in which application of the generalization occurs in exaggerated or easily observed form.
 - b. cues which will help the students to know what to look for and questions which guide them to think about what the observations have in common
 - c. a sequence in which to ask these questions
 - d. questions which may be used after students have discovered the generalization to stimulate them to think of further applications of the generalization.

V. Similarities and differences between inductive and deductive teaching

1. Given several plans for teaching in which learning will be generalized, the teacher classifies these as inductive or deductive.
2. Given a generalization which is to be taught, the teacher first plans situations in which the generalization may be applied. She plans these situations as the first step irrespective of whether the teaching is to be inductive or deductive.
3. Given generalizations and situations in which the generalizations may be applied, the teacher distinguishes between those generalizations which may be taught either deductively or inductively and generalizations which should be taught deductively because it would be very difficult for students to discover the generalization.

VI. Using curriculum guides

1. Given objectives as they are stated in home economics curriculum guides, the teacher re-states these, using Mager's criteria for stating objectives.
2. Given generalizations from curriculum guides, the teacher re-states these in words her students might use and sub-divides them if they

are too broad to teach in one day.

3. Given a list of learning experiences, the teacher selects those which are relevant for the teaching of a specified generalization.
4. Given an objective and several generalizations which may be applied by the student who reaches the objective, the teacher
 - a. plans to teach one generalization at a time
 - b. decides whether to teach each generalization inductively or deductively.

1. Store these at the place of first use.
2. Cooking beef at high temperatures causes it to shrink and become tough.
3. Irish potatoes with smooth skins that are hard to rub off are best for baking.
4. An infant learns to sit upright before he learns to pull himself up with his hands and arms.
5. High temperature and rapid cooking cause proteins to shrink and toughen.
6. Potatoes are selected to suit the method of cooking.
7. Eggs cooked in boiling water become tough and rubbery and the yolks become dark and sooty.
8. New potatoes are adapted to boiling because of their small size and their thin skins.
9. General body control follows a definite pattern of motor growth.
10. Soap and scouring pads for washing dishes should be stored near the sink.
11. Late potatoes are best for washing or in scalloped dishes because of their thick skins and irregular shape.

- II. Suppose you wished to teach generalizations found in a curriculum guide. Choose the one of the three statements following each generalization which indicates what you would plan to do early in the lesson. Place an X on the answer sheet after the letter corresponding to the statement you choose.

APPENDIX B

TEACHING GENERALIZATIONS

- I. Which statements are generalizations and which are not generalizations? Classify each of the following statements by placing an X in the appropriate column on the answer sheet.
1. An infant learns to control his whole body before he learns to control various parts of his body.
 2. Store items at the place of first use.
 3. Cooking beef at high temperatures causes it to shrink and become tough.
 4. Irish potatoes with smooth skins that are hard to rub off are best for baking.
 5. An infant learns to sit upright before he learns to pull himself up with his hands and arms.
 6. High temperature and rapid cooking cause protein to shrink and toughen.
 7. Potatoes are selected to suit the method of cooking.
 8. Eggs cooked in boiling water become tough and rubbery and the yolks become dark and mealy.
 9. New potatoes are adapted to boiling because of their small size and their thin skins.
 10. General body control follows a definite pattern of motor growth.
 11. Soap and scouring pads for washing dishes should be stored near the sink.
 12. Late potatoes are best for mashing or in scalloped dishes because of their thick skins and irregular size.
- II. Suppose you wished to teach generalizations found in a curriculum guide. Choose the one of the three statements following each generalization which indicates what you would plan to do early in the lesson. Place an X on the answer sheet after the letter corresponding to the statement you choose.

13. Generalization: Creativity is the capacity to innovate, invent or reorganize elements in ways new to the individual.
 - a. I would plan to first write the generalization on the board and ask students to give me some examples of creativity.
 - b. I would plan to break the statement down into terms a little easier for high school students to understand.
 - c. I would plan to show pictures of small children at play to get their interest.
14. Generalization: There is a universal and irreversible pattern of individual human development.
 - a. I would plan to restate the generalization, using words in the high school student's vocabulary.
 - b. I would plan to tell the students the generalization and ask each to give me some examples of irreversible patterns of human development.
 - c. I would plan to give examples of universal and irreversible patterns of human development found in a child development text.

III. Suppose the generalization is too broad to teach in one day. Place an X on the answer sheet after the letter corresponding with the statement which indicates what you would do with each of the following generalizations.

15. Broad Generalization: Play materials contribute to physical, mental, emotional, and social development of children.
 - a. State specific facts about the physical, mental, emotional, and social development of children and teach a few of these each day.
 - b. State the broad generalization each day so that students will remember it, having heard it several times.
 - c. Break the generalization into sub-generalizations to teach one at a time, later synthesizing these into the original generalization.
16. Broad Generalization: Furniture selection is determined by factors of comfort, flexibility, use, appropriateness, space required, length of service, and cost of maintenance.
 - a. Divide the generalization into small generalizations, each of which may be taught. Later draw these together into a statement of the larger generalization.

- b. Plan lessons so that there is a need to frequently state the broad generalization until the students have learned it.
 - c. List many facts in this area and teach the facts. State the broad generalization at the end.
- IV. Place an X on the answer sheet after the letter corresponding to the generalization which expresses a relation between each of the following two concepts.
17. Concepts: Pressing and the kind of fabric
- a. Press fabric of man-made fibers with low temperatures and use a thin press cloth to prevent shine.
 - b. Fiber content and finishing processes of the fabric determine the temperature and amount of moisture used in pressing.
 - c. The hotter the iron, the more a fabric scorches.
18. Concepts: Method of cooking meats and type of meat
- a. Tender cuts of meat can be cooked in their own juices, but less tender cuts must have moisture added for cooking.
 - b. Meat is cooked at low temperature to obtain the greatest tenderness and flavor.
 - c. Beef roasted to the rare state has a lightly browned exterior, with uniform rose-red slices and a narrow layer of gray near the edge.
- V. Teaching each of the following generalizations could not be accomplished in one lesson. You decide to state sub-generalizations and later guide the students to synthesize the sub-generalizations to form the broad generalization. Place an X in the column on the answer sheet to indicate whether each of the following sub-generalizations is relevant or irrelevant to the broad generalization.
- A. Broad Generalization: Adequate care prolongs the life of an appliance; it reduces cost of servicing, repair, and operation; and aids in maintaining efficiency of performance.
- 19. Proper care lengthens the life of equipment.
 - 20. To give its best service over a long period, equipment must receive consistent care.
 - 21. Consistent cleaning and disposal of wastes are required to keep the kitchen clean and orderly.

22. Appliances can be time-savers if one knows how to properly operate them.
 23. The expense of repair of equipment can be kept to a minimum by taking good care of it.
 - B. Broad Generalization: Individuals have need for all nutrients, but their differences in ability to store and synthesize nutrients influence the kind, amount, and timing of intake needed for the most effective utilization of food.
 24. Persons differ in their ability to store and use certain nutrients.
 25. Meat, eggs, milk, and cheese are excellent sources of protein.
 26. Each person needs all of the essential nutrients.
 27. Each person needs certain amounts of energy to carry on the life processes, to engage in physical activity, and to build new tissues.
 28. What, how much, and when one eats depends a great deal on one's ability to use the food effectively.
 29. The amount and kind of food needed differs from person to person.
- VI. The following two objectives, taken from a curriculum guide, do not indicate what the student will be doing when the objectives are accomplished. Place an X on the answer sheet after the letter which indicates how you would restate the objective so that you will know what the student will do to accomplish the objective.
30. Objective: To develop an understanding of housing needs.
 - a. The student knows the needs that a family must consider when buying a house.
 - b. The student describes the housing needs of a particular family in relation to the family's ages and activities.
 - c. Looking through floor plans in magazines, the student understands the features that meet certain housing needs.
 31. Objective: To develop some ability to care for equipment.
 - a. When in the kitchen, the student demonstrates principles of care of equipment.
 - b. When in the unit kitchen the student arranges the equipment for convenience.

- c. While preparing a one-dish meal, the student uses, and stores equipment according to principles discussed in class.

VII. Place an X after the letter corresponding to the generalization that will enable your student to achieve the following two objectives.

- 32. Objective: Given a situation describing the items a family considered purchasing and the reasons for the purchase, the student distinguishes between those which are wants and those which are needs.
 - a. Needs, wants, goals, and resources change during the life cycle.
 - b. A need is a necessity, and a want is a desire.
 - c. Resources are limited while wants may be unlimited.
- 33. Objective: When making a garment the student makes necessary pattern alterations for a proper fitting garment.
 - a. To make a pattern fit properly, fold out the fullness in tucks and slash, spread, and insert extra paper to add length and width.
 - b. Buy the pattern size that fits your figure type and body measurements for a proper fitting garment.
 - c. The tightness or looseness, the amount of blouse at the waist, or the amount of fullness in the skirt are influenced by the current fashion.

VIII. Place an X on the answer sheet after the letter corresponding to the best learning experience for teaching each of the following two generalizations.

- 34. Generalization: Use of frozen foods, precooked foods, and mixes saves time when preparing meals.
 - a. Explain to your students that since their food labs will only be 40 minutes, it will be necessary to use frozen and precooked foods to save time.
 - b. Have students in their unit kitchens prepare brownies by one of the following methods:
 - 1) starting with the basic ingredients
 - 2) using a dry mix
 - 3) using a slice and bake mixAsk groups to keep a record of the preparation and cooking time and compare their results.

- c. After reading assignments have students discuss the advantages and disadvantages of using prepared or partially prepared foods.

35. Generalization: Placing items used often within easy reach saves time and energy.

- a. Make a plan for cleaning a room at home. Carry out the plan, follow with a self evaluation and an evaluation by a family member.
- b. Evaluate present storage arrangement in the homemaking department. Make a written plan for better use of storage space in the homemaking department.
- c. Make a diagram of where the items that are used most frequently are stored in your closet. Rearrange your closet storage if necessary so that the items used often will be easy to reach.

IX. Suppose that you have just finished teaching the following two generalizations, using the learning experiences mentioned below. Plan an X on the answer sheet after the letter corresponding to the best assignment for each generalization which would contribute to the student's ability to apply the generalization.

36. Generalization: All basic food groups are included in a balanced day's diet.

Your class studied the basic food groups to determine their personal needs and collected pictures for a bulletin board representing the basic food groups.

- a. Evaluate a day's menu in terms of the basic four food groups.
- b. Make a booklet showing pictures of foods which belong in each food group.
- c. Make a survey of what 10 students eat for breakfast and suggest improvements.

37. Generalization: For happy relations an understanding of the feelings and actions of others is necessary.

Your class acted out family situations where feelings and actions of family members differ, such as: the use of the family car, use of the telephone, and sharing home responsibilities.

- a. Write a paper on "My Contributions to Relations at Home."
- b. Decide on one thing that you can do at home to improve family relations. Turn in a written report from yourself and one

family member evaluating your success or failure, describing what you did to help family members to understand each other.

- c. Practice understanding the feelings and actions of your brothers, sisters, and parents.
- X. Suppose you wished to teach the following two generalizations. Place an X on the answer sheet after the letter corresponding to the learning experience which would enable the student to discover the generalization.
38. Generalization: Taking care of someone's children is a real responsibility that needs preparation.
- a. Discuss the responsibilities of a baby-sitter, then ask students to discuss ways to prepare for this responsibility.
 - b. Role play situations in which students are prepared and unprepared to care for a small child. Read several newspaper articles reporting accidents to infants. Discuss consequences of giving responsibility for the care of the child to an incompetent person.
 - c. Let each student write down one responsibility of a baby-sitter. Compile these and discuss their importance as a class.
39. Generalization: Proper care lengthens the life of equipment.
- a. Show an exhibit of kitchen cutlery that has and has not been properly cared for. Ask students to pick the oldest; then point out that they were all purchased at the same time. Follow with a discussion of proper care of kitchen cutlery and utensils.
 - b. Let your students write a column for the local paper on "Helpful Hints for Selecting and Caring for Kitchen Utensils."
 - c. Properly clean and polish three pans which are made of different materials using several methods and cleaning products. Evaluate the effectiveness of each cleaning product.
- XI. If you were going to teach the following two generalizations, you might use a variety of learning experiences as described below each generalization. Classify each as deductive or inductive methods of teaching by placing an X on the answer sheet in the appropriate column.
- A. Generalization: A garment made at home usually costs less than a ready-to-wear garment of equal quality.

40. Invite a resource person, such as a clothing buyer, to discuss wise clothing selection and features which cause high and low prices of clothing.
41. Tell students how much you have saved by making your own clothes. Show some of the garments you have made and some that you have bought.
42. Borrow several garments from a clothing store. Ask students who have kept records of their expenses for making their garments to compare the quality and cost with the quality and cost of similar ready-to-wear garments.

B. Generalization: Values and goals affect spending habits.

43. Study several case situations where the way people spend their money was greatly affected by their values and goals in life. Guide the discussion with questions that will lead to the generalization.
44. Tell the students the generalization and then ask them to list their personal values and goals, and to tell how these affect their spending habits.
45. Have students show or tell about the last thing they bought and why they bought it. Ask them to relate their reasons to their personal values and goals. Discuss the relationship between values and goals and spending habits.

XII. Below are two generalizations with suggested learning experiences. Place an X on the answer sheet after the letter corresponding to the one learning experience which is most relevant to the generalization.

46. Generalization: Children of the same age are not alike.
 - a. Have students compare two children the same age to discover what they do, what they eat, how tall they are, how much they weigh, and what they say.
 - b. Study references and discuss growth patterns of children.
 - c. Present a film on mentally retarded children. Following the film discuss how these children are different and similar to normal children.
47. Generalization: Needs, wants, goals, and resources change during the life cycle.
 - a. Discuss "How do individual and family needs, wants, and resources change during the life cycle?"

- b. Conduct a survey to discover community resources available.
- c. Present case studies of families at different stages of the life cycle and discuss how needs, wants, goals, and resources change from one stage to another.

XIII. Classify each of the following generalizations as either

- A) can be taught inductively or deductively
- OR
- B) can best be taught deductively

by placing an X in the appropriate column on the answer sheet.

- 48. Cooperation helps us to work better with others.
- 49. The method used for transferring pattern markings depends upon the fabric being used.
- 50. All basic food groups are included in a balanced day's diet.
- 51. Convenient arrangement of equipment has a direct bearing on efficiency of meal preparation.
- 52. The energy needed for body growth and activity is provided by foods high in fats, carbohydrates, and proteins.
- 53. An infant learns to control his whole body before he learns to control various parts of his body.
- 54. Being able to accept one's self permits greater acceptance of others.
- 55. A person's ability to store and use nutrients influence the kind, amount, and timing of intake needed for the most effective use of food.
- 56. Fiber content and finishing processes of the fabric determine the temperature and amount of moisture used in pressing.
- 57. Placing items used often within easy reach saves time and energy.
- 58. Fruits with a large ascorbic acid content are an excellent source of vitamin C.

XIV. Suppose you were teaching the following two objectives. Generalizations related to each objective are listed below each objective. Place an X on the answer sheet after the letter corresponding to the statement which indicates what you would do with the generalizations.

59. Given several labels from canned foods the student lists the important characteristics on the label that would influence his decision to buy or not to buy the item.

Related generalizations:

- 1) Labels can aid the shopper in the selection of the item.
 - 2) Every label must state the name of the product, net contents of the container, variety, style, and packing medium, and dietary properties if necessary.
 - 3) Sizeable savings can be made by reading the label and fitting the information to the family, the purpose, and the pocketbook.
- a. I would teach only 1 and 3.
 - b. I would teach all of them in the same lesson.
 - c. I would teach each generalization one at a time.

60. Given a house plan and pictures of furniture used in the plan, the students arrange furniture for convenience and appearance.

Related generalizations:

- 1) Furnishings and their arrangement should meet the needs of the family living in the home.
 - 2) Careful planning of furniture placement will add to the comfort, safety, and attractiveness of the home.
 - 3) Proportion and balance are key-notes to pleasing furniture arrangement.
- a. I would teach only generalization 1 and 2.
 - b. I would teach them all in the same lesson.
 - c. I would teach each generalization one at a time.

APPENDIX C

ANSWER SHEET

Generalization		<u>Not a</u> Generalization		VII.32. a. _____		33. a. <u>X</u>	
I.	1. <u>X</u>	_____	_____	b. <u>X</u>	_____	b. _____	_____
	2. <u>X</u>	_____	_____	c. _____	_____	c. _____	_____
	3. _____	_____	<u>X</u>	VIII.34. a. _____	_____	35. a. _____	_____
	4. _____	_____	<u>X</u>	b. <u>X</u>	_____	b. _____	_____
	5. _____	_____	<u>X</u>	c. _____	_____	c. <u>X</u>	_____
	6. <u>X</u>	_____	_____	IX.36. a. <u>X</u>	_____	37. a. _____	_____
	7. <u>X</u>	_____	_____	b. _____	_____	b. <u>X</u>	_____
	8. _____	_____	<u>X</u>	c. _____	_____	c. _____	_____
	9. _____	_____	<u>X</u>	X.38. a. _____	_____	39. a. <u>X</u>	_____
	10. <u>X</u>	_____	_____	b. <u>X</u>	_____	b. _____	_____
	11. _____	_____	<u>X</u>	c. _____	_____	c. _____	_____
	12. _____	_____	<u>X</u>				
II.	13. a. _____	14. a. <u>X</u>	_____	XI.	Deductive	Inductive	
	b. <u>X</u>	b. _____	_____	A.	40. <u>X</u>	_____	_____
	c. _____	c. _____	_____		41. <u>X</u>	_____	_____
III.	15. a. _____	16. a. <u>X</u>	_____		42. _____	_____	<u>X</u>
	b. _____	b. _____	_____	B.	43. _____	_____	<u>X</u>
	c. <u>X</u>	c. _____	_____		44. <u>X</u>	_____	_____
IV.	17. a. _____	18. a. <u>X</u>	_____		45. _____	_____	<u>X</u>
	b. <u>X</u>	b. _____	_____				
	c. _____	c. _____	_____	XII.	46. a. <u>X</u>	47. a. _____	_____
V.	A.	19. <u>X</u>	_____		b. _____	b. _____	_____
		20. <u>X</u>	_____		c. _____	c. <u>X</u>	_____
		21. _____	<u>X</u>	XIII.	A	B	
		22. _____	<u>X</u>		Inductively or	Deductively	
		23. <u>X</u>	_____		Deductively		
	B.	24. <u>X</u>	_____		48. <u>X</u>	_____	_____
		25. _____	<u>X</u>		49. <u>X</u>	_____	_____
		26. <u>X</u>	_____		50. _____	_____	<u>X</u>
		27. _____	<u>X</u>		51. <u>X</u>	_____	_____
		28. <u>X</u>	_____		52. _____	_____	<u>X</u>
		29. <u>X</u>	_____		53. _____	_____	<u>X</u>
VI.	30. a. _____	31. a. _____	_____		54. _____	_____	<u>X</u>
	b. <u>X</u>	b. _____	_____		55. _____	_____	<u>X</u>
	c. _____	c. <u>X</u>	_____		56. <u>X</u>	_____	_____
					57. <u>X</u>	_____	_____
					58. _____	_____	<u>X</u>

ANSWER SHEET (Continued)

- XIV. 59. a. _____
 b. _____
 c. X

60. a. _____
 b. _____
 c. X

* See bottom of page.

*Please indicate the number of courses you have had in methods of teaching home economics.

- _____ This is my first course.
 _____ This is my second course.
 _____ This is my third or fourth course.

APPENDIX D

RAW SCORES

Student	Score	Student	Score	Student	Score	Student	Score
1.	46	40.	44	79.	37	118.	48
2.	50	41.	44	80.	35	119.	38
3.	40	42.	44	81.	45	120.	45
4.	31	43.	41	82.	39	121.	45
5.	38	44.	44	83.	37	122.	43
6.	40	45.	47	84.	48	123.	40
7.	47	46.	40	85.	39	124.	43
8.	42	47.	45	86.	50	125.	46
9.	49	48.	41	87.	37	126.	44
10.	47	49.	43	88.	38	127.	49
11.	46	50.	48	89.	35	128.	41
12.	41	51.	39	90.	41	129.	45
13.	40	52.	40	91.	36	130.	47
14.	49	53.	40	92.	43	131.	42
15.	55	54.	34	93.	40	132.	42
16.	41	55.	38	94.	46	133.	40
17.	48	56.	42	95.	35	134.	36
18.	44	57.	32	96.	43	135.	45
19.	50	58.	38	97.	42	136.	40
20.	46	59.	36	98.	36	137.	43
21.	44	60.	37	99.	41	138.	40
22.	45	61.	47	100.	50	139.	39
23.	47	62.	35	101.	47	140.	43
24.	54	63.	39	102.	46	141.	43
25.	50	64.	39	103.	53	142.	53
26.	51	65.	49	104.	40	143.	44
27.	45	66.	49	105.	41	144.	49
28.	49	67.	49	106.	35	145.	45
29.	39	68.	42	107.	46	146.	49
30.	49	69.	41	108.	42	147.	41
31.	44	70.	38	109.	41	148.	35
32.	42	71.	40	110.	42	149.	44
33.	48	72.	51	111.	50	150.	45
34.	42	73.	42	112.	41	151.	37
35.	52	74.	49	113.	38	152.	49
36.	48	75.	49	114.	41	153.	45
37.	45	76.	40	115.	43	154.	42
38.	44	77.	43	116.	39	155.	42
39.	42	78.	45	117.	43	156.	39