REVISION AND FIELD TEST OF A SELF-INSTRUCTIONAL PROGRAM ON THE SEWING MACHINE

by

Sarah Moore Shoffner

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

Greensboro
May, 1964

Approved by

Hildegarde Johnson

Hildegarde Johnson, Director

APPROVAL SHEET

This thesis has been approved by the following committee of the Faculty of the Graduate School of the University of North Carolina at Greensboro, Greensboro, North Carolina.

Thesis Director — Hildegarde Johnson

Oral Examination Committee Members — Rosemary McGee

Rebecca M. Smith

D V Sperry

Louise Love

Helen K. Staley

April 24, 1964
Date of Examination

SHOFFNER, SARAH MOORE. Revision and Field Test of a Self-Instructional Program on the Sewing Machine. (1964) Directed by: Dr. Hildegarde Johnson. pp. 140.

The purposes of this study were to revise and field test the self-instructional program on the sewing machine developed by Moore.

Revisions of the Sewing Machine Program, prepared from the recommendations of a preliminary field test, included the addition of (1) performance frames, (2) sections of frames for objectives not programed in the first edition, (3) colored frames for various models of sewing machines, (4) an introduction to programed instruction for the students, and (5) a number of illustrations. The revised program contained 340 frames of which 71 were "no response" frames and 123 were frames requiring performance at a sewing machine. Fifteen responses were teacher-reinforced.

The following materials accompanied the program: (1) an answer booklet, (2) a time and error record, (3) a student information questionnaire, (4) a student reaction form, and (5) a teacher reaction interview record.

Four schools were selected to participate in the study. The 108 female students who proceeded through the program were enrolled in a first-year home economics class. Grade point averages were used to divide the students into high, medium, and low achievement groups which were later compared.

The program was administered by the researcher or the teacher with the help of student assistants who reinforced performance frames. After completing the program, the students responded to a criterion performance test and a student reaction record.

Students averaged 12.0 errors on the program and 3.1 errors on the criterion performance test. The correlation coefficient between these two measures was significantly different from zero, + .244. The mean time required to complete the Sewing Machine Program was 256.8 minutes or five 55-minute class periods. Comparisons of the high and low achieving students indicated that students in the lower achievement group required a longer time to complete the program and made more errors on the program and on the criterion performance test.

In general, reactions toward programed teaching and toward the program were favorable in all three achievement groups. Students agreed most favorably that programed teaching is good because students work at their own pace without interruptions, learn while they are doing something, and know immediately if an answer is right or wrong. Students indicated that programed teaching was not boring and that it was better than other methods because the important things were presented in small logically ordered steps.

The four teachers in whose classrooms the programs were used indicated that students worked individually at the machines with more efficiency than students had in previous home economics classes, that fewer sewing machine adjustment problems were encountered, and that the use of student assistants freed teachers for working with students who were not at the machines. Suggestions were made for using programed instruction in home economics classes for remedial work, regular instruction, and enrichment.

ACKNOWLEDGMENTS

The writer wishes to express her sincere appreciation to the many people whose cooperative efforts made this study possible:

To her adviser, Dr. Hildegarde Johnson, for her understanding, continued encouragement, and guidance throughout the study;

To the students and teachers who so willingly cooperated in the field test;

To members of the Home Economics Education staff at the University of North Carolina at Greensboro for their help in revising the program and preparing the accompanying materials;

To Mrs. Rebecca Smith, special credit for her assistance during the field testing;

To her committee members, Miss Louise Lowe, Dr. Rosemary McGee, Mrs. Rebecca Smith, and Mrs. Helen K. Staley, for their assistance and constructive suggestions;

To Mrs. Catherine Moore Clegg for pioneering the Sewing Machine Program;

To Mrs. Sharon H. Welker for her assistance in editing the thesis;

To Mrs. Marie Lane for typing the manuscript;

To her parents and sister for their continued encouragement; and

To her husband and son for their cooperation and understanding.

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CHAPTER I

INTRODUCTION

Programed instruction, although still a new area of experimentation in education, is receiving increased emphasis as a method of teaching in various subject matter areas for many grade levels. In the early stages of programed instruction, educators and psychologists devoted their attention primarily to constructing self-instructional programs. Current concern is focused on the use of programed instruction as well as the development of programs. Now it is realized that programed instruction, if it is to reach its fullest potential, must be considered in its widest perspective--that which will allow the integration of the programed instructional technique with other educational methods. The success of program usage may depend largely on the discovery of such combinations. For this reason and the fact that few programs are available for use in home economics, the use of programed instruction in the classroom was explored in this study.

Background for the Study

In the spring of 1962, the education staff in the School of Home Economics of the University of North Carolina at Greensboro[1] began a

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[1] In 1962 the institution was called The Woman's College, University of North Carolina. The name was changed July 1, 1963. The writer will use the new name throughout the paper.

pilot study in the area of programed instruction. At that time since no programed materials were available in the area of home economics, the staff of the education area formulated plans for the development of such materials.

During the summer of 1962, three graduate students attended workshops on programed learning. Moore (16), one of these graduate students who completed a six weeks' course at the University of Pittsburgh, initiated a self-instructional program on the fundamentals of the sewing machine. In the early stage, the program was strictly linear with verbal responses based on objectives entirely at the recall level. The staff became dissatisfied with this type of program. They believed that performance at the sewing machine was necessary if students were to learn to use a machine as well as to learn some facts about the machine. To meet this need, performance objectives were formulated and the authors of the program experimented with various kinds of performance responses. This was done even before references were made to such responses in the literature.

Because of time limitations Moore discontinued the development of frames and proceeded to field test that portion of the program which had been written. No attempt was made to program the last portion of the objectives.

The preliminary field test was conducted on a sample of forty students of seventh and eighth grade level in three schools in the proximity of Greensboro. The purposes of testing the program were to determine which frames in the program were too difficult for students and whether the frames contained an adequate number of "practice problems to insure mastery of subject content" (16, p. 50).

Moore and staff members evaluated the findings based on student responses and formulated recommendations for further revisions. Information for those interested in developing programed materials accompanied the Sewing Machine Program in Moore's thesis (16).

The findings from the preliminary field test were examined by five members of the Home Economics Education staff, and recommendations were made for revision of the program. The staff worked together five hours each week during the spring semester. Student responses and comments from the staff members who observed the field testing were reviewed. Decisions were reached concerning the program format and further recommendations were formulated for continued improvement. The major changes suggested were clarification of some of the harder steps by the addition and rewording of frames, changing sequences of sections of frames, and writing additional frames based on the revised objectives of the Sewing Machine Program.

Under the direction of the chairman of home economics education, the Sewing Machine Program was revised during the fall of 1963. Additional sections were programed for objectives which had not been programed in the earlier edition.

Purposes of the Study

The primary purpose of this study was to further develop the Sewing Machine Program and to appraise the revised self-instructional program by using a field test as the source of data. Such an appraisal was necessary in order to ascertain how well the objectives of the program were achieved and how well this type of instruction and this

particular program could be used with other teaching techniques in home economics classes. In the anticipation that the program would later be submitted for publication, the writer and other Home Economics Education staff members believed this field test was needed so that further revisions could be made.

In order to evaluate the effectiveness of the revised program information was needed concerning: (a) error rate of items in the program; (b) scores on the criterion performance test; (c) mean time required by students to complete the program; (d) attitudes and opinions of the students who participated in the testing with respect to their general reactions to the Sewing Machine Program and preferences for programed instruction as a method of teaching; (e) attitudes of the teachers toward programed instruction, reactions concerning the Sewing Machine Program, teacher understanding of her role when programs are used, and problems that the teachers encountered when administering these programed materials. In addition to evaluating the revised program, it was of interest to compare high and low achieving groups with respect to (a) errors made on the program; (b) scores on the criterion performance test; (c) time required to complete the program; and (d) attitude toward this method of teaching.

Definitions of Terms Used

The vocabulary in the area of programing includes many terms that are used synonomously rather than one term agreed upon by authorities in the field. The writer has, however, chosen one term and one definition. The definitions by Moore (16) were modified for inclusion in this thesis.

These definitions are representative of those used by the Home Economics Education staff.

Programed instruction: the method of teaching in which the program becomes a tutor for the student. It is designed and sequenced to lead the student through a set of specified behaviors which make it more probable that he will behave in a given desired way. This term is synonymous with automated instruction and automated teaching.

Programing: the process of arranging the material to be learned into a series of small steps, specifying the kind of response to be made by the learner and providing for reinforcement of the correct response.

Programer: the person responsible for developing the program. The programer may be a subject-matter specialist, a psychologist, a person trained in programing techniques, or a combination of these.

Program: the sequence of carefully constructed frames leading the student to mastery of a subject with a minimum number of errors. It is synonymous with self-instructional program, auto-instructional program, self-tutoring device, and self-teaching device.

Linear program: a program in which an ordered sequence of frames is presented. In this program the student must construct a response and then receive immediate reinforcement of the correct response. The term is synonymous with Skinnerian program, constructed response program, and sequential program.

Branching program: a program in which the sequence of exposure of the program to the student is determined by his response to each frame. The branch usually consists of a single item which explains why a particular answer is incorrect and returns the student to the original frame for another try. It is synonymous with multiple-choice program and intrinsic program.

Constructed response: a response which requires the student to complete a sentence, to solve a problem, or to answer a question. It is contrasted with selecting a response from a set of alternatives. It is synonymous with constructed answer.

Overt response: a response which is an oral or a written response, or a manipulative act. The response can be recorded by an observer.

Reinforcement: a process in which some stimulus, presented immediately following a response, increases the rate at which the response is emitted in a standard situation or increases the probability that the response will recur when the situation recurs. (A stimulus having such an effect is reinforcing or is a reinforcer (1, pp. 67-68).)

Feedback: a process of conveying knowledge of results to the learner. It may include a discussion of why the answer is correct. This term is borrowed from communication theory and used to describe some event which occurs as a result of or contingent upon the student's response. It provides a more extensive discussion of why the answer is correct, as is sometimes done in intrinsic programs. The discussion is the feedback (1, p. 65).

Frame: a single unit of material which the student considers at one

time. It varies in length from one sentence to one page of material and usually concludes by requiring a response from the student. This term is synonymous with item.

Criterion frame: a frame that tests whether the student has learned material from previous frames. It is synonymous with prover frame.

Performance frame: a single unit of material or a statement which directs the student to carry out some task other than constructing a written response. It may be considered a frame requiring one type of overt response.

Panel: a chart, a graph, a diagram, a piece of equipment, or a passage of text accessible during work on a portion of a program. This item is synonymous with exhibit.

Cue: a subtle hint which helps the student respond correctly. It may be a picture, a different color, underlining, italics, or a word. A cue is a type of prompt.

Error: the incorrect or non-appropriate response to a specific stimulus in a frame of the program.

Error rate: the percentage of incorrect responses on an item or a specific frame, sets of frames, or a whole program. A high degree of errors indicates a need for revision of the program.

Target population: the population of students for whom the program is prepared.

Terminal behavior: the behavior that a program is designed to produce.

Pacing: the rate at which the student proceeds through the program. Most programs are self-pacing. The student reads and responds

at his own rate depending upon success on the previous frames.

Criterion examination: a test or examination given to the student at the completion of a program or during the development of the program to test how much the student has learned (16, pp. 5-8).

Other definitions and nomenclature of terms are included in the summary report of the Lake Okoboji Audiovisual Leadership Conference (1, pp. 63-71).

Organization of the Thesis

The remaining chapters of this thesis include (a) a review of literature concerning the present use of programed instruction in the classroom, authorities' conclusions concerning procedures for using programed instruction, and trends in programed instruction; (b) the procedures followed in further development of the program and in conduct of the field test; (c) the findings of the field test; and (d) a summary of the study with recommendations for further research in programed instruction, for further revisions of the Sewing Machine Program, and for classroom use of programed instruction in areas of home economics.

CHAPTER II

REVIEW OF RELATED LITERATURE

Many school administrators and teachers are now faced with the decision of whether or not to introduce programed instructional methods and to invest in programed materials and equipment. Careful consideration must be given to many factors before programed instruction is introduced into an educational system. This method, like other instructional media, should be evaluated from an operational viewpoint.

There were no programs available in home economics or references to home economics studies in the area of programing at the time this review was written. In this chapter, the writer will review the factors to be considered in the use of programed instruction, the roles of school personnel, the conclusions of various authorities in the field as to how this method should be used if it is to realize its fullest potential, and present trends in programed instruction.

The Present Use of Programed Instruction in the Classroom

A survey of the use of programed instruction in the public schools of the United States during the year 1961-1962 was compiled and reported by the Center for Programed Instruction in cooperation with the U. S. Department of Health, Education, and Welfare (22). The authors reported that this guide attempts "to assay the problems, advantages, and attitudes occurring in this very early period in the use of programed instruction" (22, p. vii).

Questionnaires were sent to a population of almost 15,000 U. S. school superintendents; returns were received from over two thousand schools. The authors indicated that they could not make assumptions as to the representativeness of the sample. The sample seemed biased in that administrators of schools not using programed instruction might have a tendency not to respond to the questionnaires. The authors believed, however, that the approximately two thousand returns provided some perspective into the use of programed instruction.

School superintendents with little or no experience in the use of programed instruction were classified in the "non-user" group, and those of systems using programs were classified in the "user" group. The number of respondents in the non-user group totaled 1,671. The user group was made up of 209 respondents.

Administrators in both groups who responded to the questionnaire indicated that they had learned about programed instruction by reading professional publications. Non-users as well as those who had used programed instruction were familiar with the terms.

Among the schools reporting in the survey, teachers seemed to be primarily responsible for initiating the introduction of programs, although in a few schools the curriculum coordinator had assumed this responsibility. The modal time from initial contact with programed instruction to experimental or classroom use was between three months and a year.

The first steps toward the use of programed instruction varied from school to school. The largest percentage obtained program samples and established planning groups. A small percentage of school

administrators either had appointed or planned to appoint a program director. In other schools part time consultants were employed. Representatives had been sent to workshops from many schools. As an important step in the introduction of programed instruction, many schools had planned means for informing lay groups about this new method of learning. The strongest causes for the success of programs were seen as the "attention, encouragement, and recognition" given to teachers by people outside the classroom.

In most schools in which they were used, a few students used programs on a trial basis. Programs were used for group instruction in a few additional schools. Half of the users had provided programs for remedial work; over two-thirds used programed instruction for regular instruction; and 60 percent used it for enrichment. These categories were not mutually exclusive; in many schools programed instruction was used for remedial work, for regular instruction, and for enrichment. Sixty percent of current usage was with average students.

At the present, more programed textbooks are used than programs in teaching machines. School administrators are financing these materials from the regular school budget. Teachers have been granted paid overtime or paid vacation time for program development in a few larger school systems.

Margulies and Eigen (14, pp. 152-57) discussed the application of programed instruction in the elementary school classroom. They reported that elementary school personnel have yet to feel the impact of programed instructional procedures. Less than 20 percent of the available programs were written for use in elementary schools; however, the authors expected

an increasing number to be developed in basic skills such as reading, composition, arithmetic, and foreign languages. They predicted increasing attention to the gifted child for whom acceleration is limited under a single teacher's guidance, and to the remedial student who needs to learn basic skills. Another unique contribution of programed instruction at the elementary level sighted by Margulies and Eigen is that of supplementing the background knowledge of the teacher. The trend is to introduce more complex subjects, such as foreign languages, in elementary grades. The elementary teachers could use programs for their own preparation for teaching in these areas.

Margulies and Eigen discussed briefly the limited use of programed instruction in colleges and universities. Thus far very few programs are used except for remedial and "refresher" instruction. Many experimental programs have been produced through the research of faculty members.

Lysaught and Williams (13) reported that colleges have introduced programs for work in nursing education, business administration, mathematics, and the sciences. Programs are also used in adult education by school and industrial personnel for job training, office procedures, mathematics, and supervisory training. Lysaught and Williams concluded that . . . "programed instruction is useful at every stage of the continuing educational process" (13, 148-49).

The use of programed instruction has been categorized by most authors into regular instruction, enrichment, remediation, and review. In addition Lysaught and Williams suggested using the programed method for complementation. They define complementation as using programed

instruction for introducing a brief sequence not normally included in the curriculum. This introduction of the programed instructional method "contributes significant information and experience," but it does not interfere with regular instruction (13, p. 150).

Lysaught and Williams (13, p. 152) suggested the use of programs for homework, review, and new assignments. Another approach is to make programs available as reference material, but not as a part of regular instruction. Self-instruction laboratories in which programed materials are centralized for use at the learner's convenience were also suggested.

Klaus (10, pp. 1-5) conducted four experiments on the use of programed instruction in high school physics classes. The following were explored: (a) the use of auto-instructional materials as a supplement to classroom instruction; (b) the effectiveness of programed instruction when used without classroom lectures and discussion; (c) the use of programed instruction in laboratory work; and (d) the development and tryout of materials to accompany high school science courses.

Knirk (11, pp. 97-98) summarized four general techniques for using programed instruction. The first technique recommended is the use of a program early in a class period, followed by a discussion period. With this technique the amount of material covered in one day is limited either in time or content. Teachers may find the daily activity change motivational; however, different reading rates cause confusion, and discussions are difficult to control when a time limit is imposed.

Knirk recommended as a second technique that a complete program of a unit of a program be assigned, followed by small group discussions composed of students finishing the program at nearly the same time. For those finishing extremely early, advanced material is assigned.

Thirdly, a program may be assigned for homework followed later by classroom discussion and application through laboratory periods and field trips.

The fourth technique recommended by Knirk is that a program be used for the entire class period. He reported that this technique is not as popular since students prefer a variety of methods.

Factors in the Use of Programed Instruction in the Classroom

Cost

For some administrators the most important factor to consider before adopting programs is cost. A realistic estimate of the cost of this method of instruction is not based upon initial investment of teaching machines and textbooks since such a calculation would be overwhelming. Initial investments vary greatly depending upon the complexity of the programed materials. Simple program texts may cost only a dollar whereas the price of elaborate electronic computers ranges to thousands of dollars. Fry (7) suggested that the administrator can gain some insight into the real cost over a period of a few years by estimating length of use and calculating both initial and operating costs.

The survey conducted by the U. S. Office of Education reported the costs of the use of programed instruction in U. S. schools. The average cost of each program in the last year or two was between ten dollars and 15 dollars. It is predicted from figures presently available that this is a good estimate of the initial cost of programs which will be used in the immediate future (22, pp. 44-45). Programs range in

price from two to 57 dollars. Seven percent of the schools in which programs had been used obtained free experimental copies from publishers; 2 percent used programs costing less than one dollar; 17 percent, between three and five dollars; and 5 percent, between five and ten dollars. Thirty-seven percent of the programs cost ten to 15 dollars and 9 percent of the respondents paid over 15 dollars for each copy. Many of the programs costing over 15 dollars had supplementary hardware included (22, p. 27).

Fry (7, p. 107) pointed out that "when the final cost of a programed learning sequence is being calculated, some of the 'hidden' benefits of programing ought properly to be balanced against it if a fair estimate of true cost is to be reached." A savings may be made in the cost of instructors especially when programs are used for a supplement to regular instruction. Simulated training through programs may dispense with expensive apparatus. An important but indirect saving can be effected if damage to equipment can be eliminated. Programing may offer a safer alternative when hazardous conditions are simulated. This, of course, does not imply that actual situations are not to be included in education; it implies only that the program may be used as a preliminary experience.

The major point by Cook and Miller (2) in reference to expense was that

> . . .programed instruction has the potential to greatly increase the efficiency and effectiveness of educational processes in schools. The savings, therefore, are less likely to be monetary and more likely to be in terms of highly increased efficiency, greater learning on the part of the individual student, and much more effective use of the teacher. It seems probable, therefore, that for equivalent expenditures, one can expect a higher level product that is better education and a much more satisfied and enthusiastic student body and faculty (2, pp. 49-50).

Space and Maintenance Requirements

The need for additional space in schools has long been recognized by educational administrators. Large scale use of programs will multiply the existing space problems unless there is advanced planning. The introduction of programed texts presents the same problems that arise with the addition of new textbooks. When teaching machines are introduced, logistic problems have an even broader dimension.

Some of the arrangements demanding consideration are reported in Fry. Teaching machines weighing from one pound to hundreds of pounds require spaces ranging from the size of a textbook to that of a large room. If isolation booths are used, space and ventilation as well as lighting have to be provided. However, most machines may be installed in the regular classroom. Some installations may require electrical power, thus necessitating additional wiring. Machines which use ambient light are available.

The programs used by the machines also require space. Programs are available in standard paper sizes, on rolls of paper, and in folded sheets. The folded sheets have proved to be bulky in quantity. The use of regular microfilm achieves a considerable saving in space; and miniature microfilm is more economical because it includes more than 200 frames on a card about the size of typing paper. Since no machines are needed, programed texts have partly solved the space problem. Nevertheless, authorities advocate more extensive use of microfilm in the future.

Since all these problems need to be delineated in order to establish a successful learning program, Fry suggests that the "forward-looking administrator" must give serious thought to planning these space

requirements. Educational systems planning to use programed instruction in the near future should include space in the plans for future expansion.

Personnel as well as space may cause problems if programs are used extensively in a school system. The use of elaborate apparatus would require highly specialized technical personnel for regular maintenance and repair.

Personnel in the Use of Programed Instruction in the Classroom

The Role of the Administrator

Tucker (21, pp. 163-169) discussed the role of the administrator in the use of programed instruction. First, in considering the introduction of a new instructional media the administrator must translate suggestions from the literature about this media into practical use. This need becomes evident with the integration of some new instructional devices when more problems are created than solved. Tucker suggested evaluating materials from an operational viewpoint and considering "such intangibles as psychological and social acceptance" of the programed instructional method in the school community.

Tucker (21, pp. 165-68) outlined guidelines for evaluating the feasibility of using new instructional media. He made suggestions concerning the evaluation of programed learning materials, the evaluation of a teaching machine system, the administrative implications of using a teaching machine, the classroom and other logistics, the engineering soundness of the teaching machine, and the financial issues associated

with the introduction of the programed instructional method.

Cook and Miller (2, pp. 46-47) introduced the role of the administrator under two main headings: that of preparing the teacher to use programed instruction and that of informing the parent of the nature of the process. The administrator must create a positive work climate for the teacher. This may be done by becoming increasingly "sensitive to the attitudes and problems of the teacher." In addition, the administrator needs to establish in-service training programs about programed instruction before introducing it in the school system.

Cook and Miller (2, p. 47) suggested activities to inform the parents of "the true nature and the implications of programed instruction for their children's education." The available "communication channels" for informing parents are the Parent-Teacher's Association, the Board of Education whose members are representative of the community and parents, a series of special meetings, home visits or conferences arranged by the teacher, and "open house demonstrations."

The Role of the Teacher

Various writers have questioned whether the teacher will become less important when programed teaching is used more widely. Komoski (12, pp. 11-12) emphasized the vital importance of the teacher. He contended that programed instruction cannot be used to relieve the teacher shortage, nor can it teach everything that is taught in school, "thereby replacing all teachers except those who can pass the qualifying exam as machine repair men." Programed instruction will demand better, more thoroughly trained teachers than does conventional teaching. Programed instruction cannot educate a person. Programed instruction is "instruction," but

teachers are educators who must cultivate in students the ability to interrelate knowledge and use it creatively. Cronbach (4, p. 47) also emphasized that "the quality of teaching is more important than the form it takes."

The editors of The Use of Programed Instruction in the U. S. Schools, previously discussed (22, p. 54), emphasized the importance of teacher flexibility in this new instructional approach. Students must work on an individual basis; thus the teacher is responsible for more variation in activities than when he worked with the students as a group. Academic knowledge is not the only quality involved in teacher flexibility. With the continued use of programed instruction, the knowledge, ingenuity, and diplomacy of the teacher must guide the student to the next appropriate activity. In fact, the authors believe that the guiding and advising role of the teacher will outweigh the traditional roles. This change to more teacher flexibility requires understanding and acceptance by the teacher and the school.

Deterline (5, pp. 67-78) devoted a chapter in his book to the relation between teachers, students, and auto-instruction. He emphasized that auto-instructional materials should relieve the teacher of ineffectual activities and give him more time to work with each student. Deterline said,

> Auto-instruction will not necessarily make a teacher's job any easier, and might even make it more difficult, since the level of student achievement will be higher and the teacher must be prepared, skilled, and ready to talk about subject matter at a higher, more subtle and more abstract level than present conditions require of her (5, p. 70).

Poor teachers will be incapable of providing students who are rapid learners with experiences to promote original thinking, thinking which

goes beyond the programs. Good teachers will become irreplaceable. Deterline stressed that programed instruction will become a "teacher's pet" because it will eliminate tedium and allow creativity.

Mills (15, pp. 1-24) further emphasized that programed instruction is not a substitute for the teacher. He pointed out that this instructional method is potentially a great aid and can relieve the teaching process of a significant amount of drudgery. The repetitive aspects of teaching can be assigned to the programed materials, thus freeing the teacher to work with the slower students or with those who are ahead of the class. The teacher takes responsibility for the more abstruse parts of the subject.

Mills recognized that new problems in teaching develop with the use of programed instruction in the classroom. The learning time is varied, and student work rates differ. The teacher must plan and manage the use of programs within the total learning situation. Mills indicated several ways to use programs. A total program can be covered in sequence, or certain parts can be assigned one at a time. Some teachers allow students to cover material as rapidly as the "various students' learning will permit" (15, p. 19). The teacher then provides additional topics to use the remaining class time. Other teachers prefer to include various enrichment topics as the course progresses. Mills recommended that the program itself include activities such as references to supplementary books and topics for the teacher to present to the class or to individuals who finish the program ahead of others in the class.

Mills also discussed the possibility of preparing programs for the teachers. He suggested that these programs could provide the

teacher with an "effective teaching guide on material prior to presenting it in class" (15, p. 23). Teachers in training, as well as in-service teachers, would benefit from programs specifically designed to meet their needs.

Fry pointed out the importance of a program as a means of individualizing instruction and explored the enormous potential of this method in mass education. He contended that

> a program can be used in a wide range of instructional situations, chiefly because it is a teacher, a teacher that can be fitted easily into existing staff either as a replacement or as a supplement (7, p. 101).

Fry agreed with other writers that the use of a program adds to the demands of the teacher by requiring careful diagnosis of learning difficulties. He emphasized that "inspiration, motivation, evaluation and discipline" must emanate from the teacher; therefore, it is wise for one skilled in the subject-matter area to be present in the classroom at all times.

Even though Fry emphasized the desirability of the teacher being present in the classroom when students are proceeding through a program, he believes programs may be used in situations where the teacher cannot be present. Fry encouraged teachers to plan instructional materials carefully for use in the following ways: to supplement regular teaching, to permit individual students to progress at their individual rates, and to teach basic skills. With programed materials used for the purposes mentioned above, the "live instructor" will be made responsible for the more complex syntheses.

Williams (23, pp. 153-162) said the teacher should be the "guide of learning." To further explain this role of guiding the student,

Williams said that the teacher must not be an "information disseminator" alone, but he must have "the desire and the capability to guide the youthful learners, to see to it that what has been experienced by the learner is of appreciated value to him" (23, p. 157). Then the function of the teacher is the designing of educational experiences. Williams discussed this role of the "master teachers" as he speculated on what the school of the future may be like.

The success of programed instruction in the classroom may depend largely on the attitude of the teacher. Cronbach (4, pp. 45-47) reviewed studies in which the authors reported that when teachers are favorable toward programed instruction, student performance in classes in which programs are used is equal and sometimes superior to that of conventional classes. An inferior student performance on programed materials was reported when teacher attitudes toward programed learning are unfavorable.

Joos (9, pp. 1-3) reported that teachers may feel frustrated when programed materials are used because they cannot teach in the same way as they do in standard teaching situations. This may affect their attitude toward programed instruction.

Persons lecturing at a workshop attended by Huffman (8) stressed the importance of the relationship of the teacher's attitude and understanding to the effective use of programed materials. In her discussion, Huffman included this quote from Barcus:[2]

> Without the teacher's enthusiasm, a program is no good. The teacher must keep the children interested; the teacher is the cheerleader (8, p. 3).

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[2]Delbert L. Barcus, in June, 1962, was a programer employed by the Denver Public Schools.

Probst (17, pp, 1-24) summarized the proceedings of the 1962 Conference held by Thomas Alva Edison Foundation and Grolier Incorporated. He began discussing the role of the teacher in programed learning by explaining the mistaken premise that machines will replace the teacher. Emphasis was placed on the idea that programed materials introduce a "second and specially well-qualified teacher," rather than removing a teacher from the classroom. He defended this idea by emphasizing that program producers hire subject matter specialists to prepare programs.

Probst reported that conference participants stressed the opportunities for the teacher to initiate and interpret ideas whereas the program provides "core information." Probst reported that programed instruction increases the demands on the teacher; moreover, it provides a more satisfying experience because of the individualized instruction.

The amount of subject matter to be taught increases each year. Probst stated that programed instruction can help the teacher solve this problem, "since there is more learning efficiency with programs than with traditional methods" (17, p. 12).

After explaining the various aspects of the teachers' role, Probst concluded with the following:

> . . . the role of the teacher in programed instruction is not likely to be settled in a few trials of programs and machines; nor will the new role of the teacher be defined only in relation to teaching machines. It will be defined, as it always has been, in relation to goals of learning (17, p. 12).

Skinner (19) contended that machines will not replace the teacher. He said that the machine is "equipment to be used by teachers to save time and labor" (19, p. 156). When certain functions are assigned to machines, the teacher becomes an indispensible human being. Skinner

further emphasized that traditional practices in the classroom will change when programed instruction is used. One example of this change is that students in the same "grade" might proceed at their own rates as rapidly as they wish. Another change suggested by Skinner will be in assigning grades on report cards to indicate mastery of a course.

The final aspect of the changing role of the teacher discussed in this review of the literature was explored by Lysaught and Williams (13). They stressed that it is necessary for the teacher to take an experimental approach to the programed instructional process by testing programs and possibly constructing sequences of frames. They advocated this procedure because it will bring the teacher to the "realities of learning" (13, p. 155).

Stolurow (20, pp. 145-49) presented what he thought this "revolution in education" (use of programed instruction) would mean in the high school with respect to the school teaching staff. He did not advocate replacing the teacher with programs, but he did suggest that various educational analysts in specialized subjects, who would "review student records on an individual basis," comprise the staff. These staff members would become a part of a guidance center where students have difficulties diagnosed and receive recommendations for further improvement. The teacher would then help the student make these improvements.

The Role of the Student

Attitudes of students toward programed instruction, as well as attitudes of teachers, influence the amount of learning which takes place when this method is used. Fry (7, pp. 107-8) reported that

programed learning has usually been very popular with students and faculty. For an example, he reported a summary of the attitudes of students using Analysis of Behavior, a programed textbook in psychology by Holland and Skinner. Approximately 60 percent of the students believed that the use of a programed text made the material easier to understand; only 3 percent believed that they received no contribution to learning from programed materials. Many students liked learning the results of their response immediately, and others indicated that they thought the program was challenging. Fry indicated the danger involved for programed instruction when students are not prepared for using this method.

Filep (6, pp. 170-89) discussed the role of the student in the use of programed instruction. He stressed the responsibility of the student to obtain his own education by gaining basic facts and information from the program. Poor interpersonal relationships between the student and the teacher should no longer be an excuse for failure to learn in a course.

The changed role of the student when programed instruction is used was discussed by Lysaught and Williams. The new role was defined as "active interaction between the student and the sequences" (13, p. 156). The student will no longer be passive but will be an active "partner" to his development. In addition, new areas of learning will be open for exploration particularly to those who attend high schools where many courses are not offered.

Deterline (5, pp. 51-66) summarized experimental results of various studies in which student attitudes toward programed instruction

were reported. An attempt was made in each study to determine what students felt about the programing method in relation to such characteristics as repetition because of small steps, reinforcement of the correct response, ease of learning as a result of slow progression through the program, and logical sequencing of principles. Deterline reported another study by Klaus and Deterline in which they attempted to ascertain student preferences for methods of instruction. Generally, students preferred a combination of a teacher and a program.

Preparing Students and Staff for Programed Instruction

One of the most difficult problems in the use of programed instruction may be the introduction of the method to teachers, students, and parents. Fry (7, pp. 107-108) emphasized the importance of awareness on the part of administrators, teachers, students, and parents of the nature of the method, the principles on which it operates, its present use, and its contemplated future. A new method receives a fair trial when it is used in a favorable environment by teachers who have been trained to use it correctly. A means of interesting students and staff, suggested by Fry, is to acquaint them with records of the accomplishments of the programing method. One may also lend success to the use of programed instruction by preparing parents for initial uses of the method. This would be particularly true at the elementary level.

Huffman (8) suggested materials that could be used to interest teachers of home economics in the method and to provide basic information for "teachers who have a favorable impression of programed instruction and wish to learn more about using it" (8, p. 9). The list of materials recommended by Huffman is recorded in Appendix A.

Cook and Miller (2) prepared a study guide in programed learning for the North Carolina Board of Education which would be helpful to schools desiring basic information. This publication includes a review of the general nature of programed instruction as well as the role of programed instruction and the teacher, pupil, and administrator. The appendix of the study guide includes references to producers of programed instruction materials and to specific programs available.

Trends in Programed Instruction

Silberman (18) stated that "the trends in programed instruction promise dramatic improvement in educational technology" (18, p. 149).

Program goals

Early programs, based on the experimental work and the writings of Skinner, were strictly linear and were composed of constructed response frames. Sequences began with frames containing many cues. The cues were gradually faded, and at the end of the sequence the student's behavior had been "shaped" in the desired fashion.

As a result of the rapid change in programed instruction during the past five years, there is a trend toward a broader view of programing. Silberman emphasized the view in which the behavioral goals are permitted to determine the stimulus and response modes. In other words, the nature of the objectives should dictate various program forms. The first approach is to ask "What behaviors are we trying to establish . . .?" (18, p. 136) Then the programer can determine the tools and response modes required to reach the terminal behavior.

The trend to permit the behavioral goals to determine the stimulus

and response modes will result in programs which will produce more transfer of learning to external situations. The program will teach verbal principles which will "permit generalizations of the skills acquired to a wide variety of external situations" (18, p. 136).

Silberman reported that this trend is evident only in the more recent programs. Earlier programs emphasized verbal abstractions or rules about the subject, whereas present programs are increasingly incorporating both generalizations and skills. The student's attention is directed to the "correspondence between the verbal rules and the skill behavior" (18, p. 137).

Cronbach (4) agreed that few of the present programs provide for the "ultimate transfer of generalized, verbal concepts to concrete, nonverbal situations" (4, p. 47). He stated that "somewhere, verbal concepts must be blended with observations on and responses to concrete reality." He briefly reviewed publications including experiments in "divergent thinking and creative imagination" (4, p. 47).

Programing Methods

Silberman (18, p. 138) reported a trend in the diversification of programing methods. Four methods are currently being evaluated: (1) the linear method which is advocated by B. F. Skinner; (2) the intrinsic or branching method proposed by Norman Crowder; (3) a method by Gilbert termed "Mathetics;" and (4) spiral programing.

According to Silberman (18, p. 139) the rapid diversification of programing methods results from the need to make a program responsive to individual differences. The program must assess learning deficiencies at various stages in the program and provide different routes for

different students. The more elaborate branching methods help meet this need (18, p. 139).

A programing problem recognized by the System Development Corporation is the difficulty of stimulus control because of interference effects. In some cases cuing techniques were found to impede learning. This interference problem appears in most current programs, reported Silberman. He also reported that a procedure to overcome interference had been outlined by Galperin and that Gilbert's sequencing rules would also eliminate interference.

Application

An increasing emphasis on the practical classroom application of the findings of research in the area of programed learning is evident in the studies reported by Silberman. A number of field tests of programs have been conducted. Computers have been used in large school districts to solve practical management problems such as scheduling and room and course assignment.

Mills (15) stressed that a need in high school teaching is agreement among professional educators on the subject-matter emphasis in each grade and "effective organization of the total school program on a sequential, developmental basis" (15, p. 20). Mills (15, p. 20) stated that the trend is for programed teaching to provide the framework for learning concepts and generalizations. The individual student can then be directed to incorporate new knowledge within this framework.

Research in Methods

In the developmental stages programing research was directed

toward the efficiency of automated teaching in relation to the variety of "conventional" methods of teaching. The trend reported now by Coulson (3) is to find out "what auto-instructional methods can provide most effective instruction for a particular learning task and a particular kind of student" (3, p. 2). As a future step, Coulson pointed out that programed instruction must be considered in perspective with other educational techniques to discover what combinations will lead to optimum learning. However, he contended that the assumption cannot be made, that "programed instruction, as now conceived, will prove the most effective technique for all educational situations" (3, p. 3).

CHAPTER III

PROCEDURE FOR REVISION AND FIELD TEST OF THE PROGRAM

Purpose of the Study

The purpose of this study was to appraise the revised self-instructional program on the sewing machine. A field test was necessary in order to evaluate how well the objectives of the program were achieved, and how well this type of instruction would fit into the home economics classroom.

Preparation of the Revised Program

As a member of the Home Economics Education staff, the writer began revising the Sewing Machine Program in the fall of 1963. The recommendations by Moore (16) and Home Economics Education staff members were reviewed; based on revision of the objectives, plans were made for writing additional frames. A copy of the objectives of the revised program is included in Appendix B. These objectives are stated as specific behavioral reactions in that they state the performance the learner should demonstrate when he has finished the program.

The material presented in the program was arranged in logical sequence to facilitate proceeding through the program, learning the parts of the sewing machine, and performing certain operations on the machine. This sequence is presented in the contents of the program.

Performance frames were written to guide the learner in performing certain operations on the sewing machine. These frames were indicated by a black dot in the upper left corner. The student was directed to make a check in the answer booklet after a performance frame was completed. In order to reinforce correct performance and to recognize incorrect performance before a student learned the wrong procedure, the teacher was directed to check the student's work at various intervals in the program. When she had completed a performance frame marked with a black dot, the student then raised her hand to signal the teacher.

After the preliminary field test was completed it was evident that some of the frames in the program were not applicable to all the models of machines used by the students. Diagrams and directions in the program did not coincide with the machines. In order to eliminate confusion and to reinforce correct information the staff decided to prepare a program for each sewing machine model.

Numerous models of sewing machines are available on the market and are present in home economics classrooms. The task of programing separate frames for each model would have been a great task. Because of this complexity it was decided that the models most representative of those in home economics departments should be chosen and a program written for each of them. Since Singer sewing machines are most widely used in this area in home economics classrooms, programs were written for five models of Singer machines. Each program contained frame insertions whenever the part of the sewing machine under discussion differed for the various models. Each of these five programs may be

applicable to other machines in the same number series. The particular frames (approximately 14 percent of the total) applicable only to certain models were printed on paper of different colors (see Appendix C). The five colors - green, blue, pink, gray, and yellow - were chosen to represent the five models.

Preparation of Illustrations

Comments from students in Moore's study (16) provided clues to the value of the various illustrations depicting certain machine parts. A few of the original diagrams were redrawn for clarification and many new illustrations were sketched for the revised program. The objective of the study was to produce an illustration as nearly representative of the actual machine part as possible and yet make it simple and clear. Label lines were carefully placed to emphasize the specifics being mentioned in each frame. A large diagram or panel, separate from the program, was used for reference by the student whenever the program directed her to a diagram of the sewing machine (see Appendix C). These diagrams, corresponding to each machine model, were provided by Singer Sewing Machine Company. Each diagram was numbered to correspond to the parts of the machine presented in the program.

Format

Basically, the format of the revised program followed that of the original. Three frames were typed on each mat, the art work was completed, and finally, the program was printed by a lithographing process (see Appendix C). Each page was cut into three frames, the answer portion of the page was folded back, and two holes were punched in the

left side of each frame. The 340 frames were assembled. Because of a natural break in the program contents the first 169 frames were included in Part I and placed on metal rings. Part II consisted of the remaining frames. This division also made handling and storage easier. Two rings were used for each book to prevent the pages from shifting during use and storage.

Cover sheets were designed for both sections and printed on heavy flexible paper stock. These made an attractive program as well as protected the frames from tears and soil.

The type of printing process chosen imposed fewer limitations on the complexity of the diagrams than did the mimeographing process used for the original program. The resulting diagrams and script were very clear.

Introductory Section

The introductory sections were designed to encourage interest in the program and to provide important information and instructions. A brief explanation of the programed instructional method was included for the student in the introduction to the program. This explanation and directions for completing teacher reinforced performance frames were built into the program. Lysaught and Williams (13) suggested as a merit in programing some of the directions that students often require a certain amount of adjustment when acquainting themselves with the programed instruction technique. An introductory section would facilitate student adjustment to this new method before approaching the subject matter (13, pp. 152-53).

Supplementary Materials for Field Testing

Answer Booklet

Answer booklets (see Appendix D) were developed and lithoprinted with numbers and ruled spaces corresponding to the frame numbers in the program. One column of answers was vertically centered on a standard size half page. Several spaces were reserved for constructed responses whereas performance frames had a short space provided in which the student made a check when work on that frame was completed. Large black dots on both the program and the answer booklet were used to indicate those frames that required teacher reinforcement. The procedure for teacher reinforcement was explained in the introductory section of the program. When the student was not required to write or perform a response, the words "no response" were printed beside the frame number in the answer booklet and on the back of each frame.

The booklets were designed on half pages of standard size paper for ease in storage and placement on the machine while the student worked. Each student wrote her name on the outside front cover.

Time Record

A time record (see Appendix D) was developed on which the student could record daily the time she spent working on the program, the number of frames she completed, and the number of errors she made. The time record was designed on a half page of standard size paper so that the student could easily store it in the answer booklet between work periods.

Student Information Questionnaire

A questionnaire (see Appendix D) was developed to determine which

students had had previous experience with the sewing machine and from what sources they gained this information. The student responded to the questions by making a check either in the "yes" or the "no" column. The information from this questionnaire was used in describing the student population participating in the field test.

The questionnaire was also designed on two half pages of standard size paper for inclusion in the answer booklet at the beginning of the field testing. After the student completed the questions, the information sheet was filed for later use.

Student Attitude Sheet

A student attitude sheet (see Appendix D) was developed to be checked by each student after the completion of the program and the criterion performance test. The purpose in using this reaction sheet was to obtain the student's personal reactions toward the Sewing Machine Program and toward this new method of learning.

The two-page form included twenty-two items which were statements describing programed teaching as a method of learning. A few of the items described uses of programed instruction. The student responded to these items on a five-point attitude scale by choosing the term which best described her personal opinion of the statement. Five terms indicating varying degrees of favorableness from which she could choose were "agree very much," "agree," "uncertain," "disagree," and "disagree very much."

Teacher Reaction Interview Record

An interview record (see Appendix D) was developed to ascertain

teacher opinions as to the effectiveness of the program and this method of teaching in high school home economics classes. This was used in an informal conference with each teacher about one month after the completion of the field testing. The delay in the time was planned to allow the teacher time in which to observe her students working in a clothing unit for a period after the program was completed.

Field Testing of the Program

Field testing was scheduled to begin in January, 1964, in order to allow ample time for preparation of the program copy and for collection of field testing supplies during the fall semester of 1963.

Source of Subjects

This study was limited to the use of the Sewing Machine Program in four schools in the proximity of Greensboro. Letters (see Appendix E) were sent to all the Guilford and Randolph County home economics teachers who, in the fall of 1963, had indicated that they would be conducting clothing classes in Home Economics I in January, 1964, and who had expressed a desire to use the program. The teachers completed and returned an information sheet (see Appendix E). From these information sheets four teachers were chosen on the basis of the scheduled time for Home Economics I classes to meet, and the distance of the school from the University campus.

A letter was sent to the principals of the four schools explaining the field testing procedure (see Appendix E). After the principals indicated that they would like to have their school participate, a conference was arranged with each teacher to discuss the details and to familiarize her with the program and supplementary supplies.

Description of the Schools

School A was a small town school serving the surrounding rural area. Students participating in the study were ninth grade students enrolled in Home Economics I.

School B was a Greensboro city junior high school which received special education students from other schools along with the regular school district student body. The students participating were classified in the ninth grade although some were older because of previous failures.

School C was a large consolidated county school. Students participating in the study were ninth grade students enrolled in Home Economics I. Some of the students had had previous experience in a seventh or eighth grade home economics course.

School D was the campus laboratory school for the University. Students participating in the study were ninth and tenth grade students in Home Economics I.

A total of 108 female students began participating in the field testing. The number of students who completed the program and the supplementary materials was 106. One student did not complete the program because of absence from school; another student did not complete the attitude reaction sheet. Twenty-four students from School A participated in the study; 27 from School B; 43 from School C; and 12 from School D.

Grouping Students

Student grade point averages for 1962-1963 were used as a basis for grouping the subjects into three categories. Students with grades

between 93 and 100 were placed in Group I; students with grades between 80 and 92 were placed in Group II; and those with 79 or below constituted Group III.

Personnel Administering the Program

The writer and a Home Economics Education staff member administered the program in Schools B and C. Materials were taken to School A on the first day. After the testing was initiated, the teacher was in charge of administrating the program and supplementary materials. In School D the teacher used the directions accompanying the program without the help of the researchers. Since this was the University laboratory school, the researcher could have been called in an emergency. Other members of the staff in the Home Economics Education area observed the field testing on several occasions in Schools B, C, and D.

In Schools A and C the teacher chose two students to complete the program in advance of the field testing. These students assisted the teacher or the researcher in observing performance of students responding to frames indicated by a black dot in the program.

Instructions to the Teachers

Instructions for teachers (see Appendix F) were formulated for use in the field testing and for future occasions when a teacher would administer the program alone. These instructions included a description of the programs for various machine models, a list of supplies needed by each student, directions for preparing the sewing machines, and an explanation of the teacher reinforcement frames.

A copy of the instructions was given to each teacher in the study

prior to the beginning of the field testing. In addition to the conferences, the teachers used these instructions as a guide for understanding the purposes of the field testing and for preparing the necessary supplies and equipment.

Instructions to the Students

Instructions were given orally to the students by the researcher preceding the initiation of the programed text. Written instructions were prepared so that the researcher presenting the program in various school situations would give all the necessary information to the learners in the same manner and sequence of instruction. The list of instructions used by the researcher is included in Appendix G.

Classroom Set-Up

In Moore's study (16), two students were assigned to each sewing machine, thus causing students to work under crowded conditions. During the program revising period it was decided to have only one student work at each machine. Because of the program sequence this was deemed necessary in order for students to proceed through the program at their own rates and to learn how to use and adjust machine parts. Since most home economics departments have only one machine for two or three students, part of the class began the program while the teacher worked with the remaining students. As a student finished with a given machine, another student would take her place.

On each machine a tote tray was placed in which the student could store the program, the answer booklet, the time record, the sewing machine diagram, and the supplies. Other supplies distributed at each

machine included two spools of thread in contrasting colors, scissors, 14 six-inch squares of muslin, a ruler, ruled paper, and a few straight pins. From a central supply table the student could get a zipper foot, masking tape, and a three by five inch index card. Confusion was eliminated by having supplies distributed at each machine. This also provided wise use of the student's time.

The researcher supplied the thread and the squares of fabric. Each teacher was responsible for collecting the remaining equipment.

Criterion Performance Test

A criterion performance test (see Appendix H) was developed by Ross[3] to accompany the Sewing Machine Program. The test was designed in two sections: directions for students and a teacher's check sheet.

Immediately after each student finished the program, the teacher, her student assistant, or the researcher gave the student a copy of the criterion performance test. The word "test" was omitted from the student instructions to prevent the student from being frustrated. The student read the directions, completed the indicated performance, and raised her hand so that the teacher could evaluate each step. For each student the teacher had a check sheet with statements describing the various performances which were being tested. When the student performed incorrectly, an "x" was placed in the blank preceding that statement. In one part of the test, the teacher made an evaluation as she observed the student's procedure.

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[3]Ross, Carolyn, a graduate student in Home Economics Education at the University of North Carolina at Greensboro, is developing the evaluation devices to accompany the Sewing Machine Program in partial fulfillment of the requirements for her Master's Thesis.

A procedure for teachers (see Appendix H) was included with the test. This set of directions described the materials needed for administering the test and the instructions for preparing the sewing machines before students began the performance test.

An analysis of the test will be included in the thesis by Ross.

CHAPTER IV

FINDINGS

The data obtained from the field test of the Sewing Machine Program will be discussed in this chapter. Student reactions to programed teaching will be summarized. Summaries of the field test data are expressed with respect to (1) errors made on the program, (2) scores on the criterion performance test, (3) time required to complete the program, and (4) attitude toward this method of teaching. The students in the high and low achievement groups will be compared with respect to scores on the criterion performance test, errors on the program, and attitude toward this method of teaching. In the final section of this chapter responses which teachers made during the informal interview concerning the effectiveness of the Sewing Machine Program in the clothing construction unit of their classes will be summarized.

Description of Students

A questionnaire administered before the Sewing Machine Program, was used to determine which students had had previous experience with the sewing machine (see Appendix D). One hundred and eight students completed the questionnaire; 25 from School A; 28 from School B; 43 from School C; and 12 from School D.

Eighty-seven of the 108 students indicated that they had used a sewing machine and 21 students had not.

Eighty students or 74.1 percent had sewing machines in their

homes. All of the respondents indicated that they really wanted to learn to use the sewing machine or, if they had used a machine, they wanted to know more about it. Only one student reported that her mother did not wish for her to learn to use a sewing machine. Sixty-two students had had someone at home teach them something about the sewing machine. Fifty-one students had used a sewing machine in a junior high school home economics class or in 4-H Club work. Seventy-four students indicated that they could thread a sewing machine by themselves, but only four said they knew the names of the different parts and how to adjust them.

In the same questionnaire all the students responded that they liked to try new ways of learning. Forty-one students indicated that they would rather listen to a demonstration than work individually on something new.

Errors on the Program

There were 340 frames in the revised Sewing Machine Program. Of this number, 20.9 percent or 71 frames were "no response" frames. Approximately 86 frames required constructed responses. There was a range of 328 to 334 responses on the 269 response frames, the number depending on the model of the machine and the program used by the student. The median of this range, 331, was used when computing the percentage of program errors.

There were 112 to 123 performance frames in the program. These frames make up 32.9 to 36.2 percent of the total program frames and 34.1 to 36.8 percent of the total responses. Fifteen or 12.2 to 13.4 percent

of the performance frames required teacher reinforcement. Of the 340 frames in the program, 4.4 percent were teacher reinforced.

Students checked the number of incorrect responses and placed this number of errors on the time record. Each of the 107[4] answer booklets was scored again by a college student who was employed to perform this task. This procedure was used because it was discovered that some students did not check and record some of the errors they had made. Incorrect responses, omission of responses, and erasures were counted as errors. Counting erasures as errors was justified by the fact that it is known that students have a tendency to want to respond correctly. Including erasures as errors may, however, result in a slight overestimate of program errors.

The mean errors for the four schools were

School A	14.4
School B	15.2
School C	9.0
School D	9.4

The composite mean was 12.0. This average of 12.0 errors for 331 responses is a 3.6 percent error rate.

An error rate of 10 percent or less was arbitrarily chosen as a desirable level of accuracy for any one frame. There were 32 responses with an error rate of 10 percent or more. The maximum number of errors on any one frame was 56. A list of frames to which there was an error rate of 10 percent or over is included in Appendix I.

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[4]One student from School B did not continue participating in the study after she completed the preliminary supplementary materials.

Time Needed to Complete the Program

The total time in minutes needed for completion of the program was summed for each student. Some students worked on the program only during the home economics class period; others supplemented this time with a study hall period.

The mean number of minutes required to complete the program by the students in the four schools was 256.8. The mean minutes in the four schools were

School A	233.8
School B	285.2
School C	242.7
School D	265.5

A frequency distribution (see Table 1) showed the number of minutes required to complete the program by 105[5] students in the study. One student from School D completed the program in 127.0 minutes; another student, from School A, required only 135.0 minutes. A student from School B required the longest time, 410 minutes, to complete the program.[6] The distribution of time required to complete the program was skewed to the right.

The revised program required one to two class periods longer than did the original program. Moore (16, p. 58) stated that the slowest student could complete the program in four class periods. The writer concluded that at least five class periods 55 minutes in length would be needed for the average class to complete the Sewing Machine Program.

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[5]Two students who completed the program did not return the time record with the answer booklets.

[6]This student had failed all of her courses during the preceding year.

TABLE I

DISTRIBUTION OF MINUTES REQUIRED TO COMPLETE THE PROGRAM

Minutes	Frequency N = 105*
120 - 139	2
140 - 159	5
160 - 179	1
180 - 199	10
200 - 219	14
220 - 239	7
240 - 259	21
260 - 279	15
280 - 299	5
300 - 319	9
320 - 339	8
340 - 359	5
360 - 379	1
380 - 399	1
400 - 419	1

*Two students did not complete the time record.

Criterion Performance Test

Immediately following the completion of the program, the students were given a criterion performance test. The test was scored by the teacher or the researcher who used an objective check list consisting of 44 items. The mean numbers of errors on the criterion performance test for the four schools were

School A	2.6
School B	5.8
School C	1.4
School D	2.6

The mean number of errors for all students in the study was 3.1. There was an error rate of 8.0 percent on the 44 items.

The total number of errors each student made on the program was correlated with the number of errors made on the criterion performance

test. The correlation coefficient between these two measures was significantly different from zero, + .244.

Student Reaction to Programed Teaching

Each student indicated her reaction to the new programed instructional method after completing the program and the criterion performance test. The two-page form, Student Reaction to Programed Teaching, was used to obtain the reactions (see Appendix D). Five categories - "agree very much," "agree," "uncertain," "disagree," and "disagree very much"- indicated varying degrees of reaction toward this program and toward programed instruction as a method of teaching. It was assumed that "agree very much" was a stronger reaction than "agree" and that "disagree very much" was stronger than "disagree."

Since students in three of the four schools[7] had not had experience with programed instruction, they reacted only to the Sewing Machine Program. Students in School B were instructed to react to the items on the Student Reaction Form on the basis of the Sewing Machine Program and not from their experience with previous programs.

The plans for treatment of data in this study included a Chi-Square computation of significance of difference in reaction to the programed instruction method among students in three achievement groups. There was a large number of cells with zero frequencies (see Appendix J). For this reason the Chi-Square analysis was not possible.

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[7]Some of the students from School B who participated in the study had used programed texts in English, mathematics, and science.

The 106[8] student responses to the 22 items on the Student Reaction Form are shown in Appendix J, and Figure 1. Some items were so stated that "disagree" and "disagree very much" represented a favorable reaction toward programed teaching. In the table and in Figure 1 the statements of attitude and student responses to these items were generally presented in order of favorableness toward the programed instruction method. Items were arranged in decreasing order of the number of students who checked in column 1 or column 5, indicating that they agreed very much or disagreed very much with the statement.

Student reactions toward programed teaching in the four schools were generally very favorable. The strongest reactions, favorable to the programed learning method, occurred in response to the following items: 1, 13, 9, 22, 6, and 10 (see Figure 1 and Appendix J). In the case of these items more checks were made in the first or fifth than in the second or fourth columns.

All of the students agreed with item 1 that programed teaching is a good way to learn because students can move as rapidly or slowly as they wish. More than three fourths of the students agreed very much and the remainder of the students agreed with this item. A large number of students (75.5 percent) agreed very much that programed teaching is good because "you learn while you are doing something," item 13.

All but four students reacted favorably that "programed teaching is better than other methods of teaching because the important things are learned step by step," item 9. Fifty-eight percent of the students

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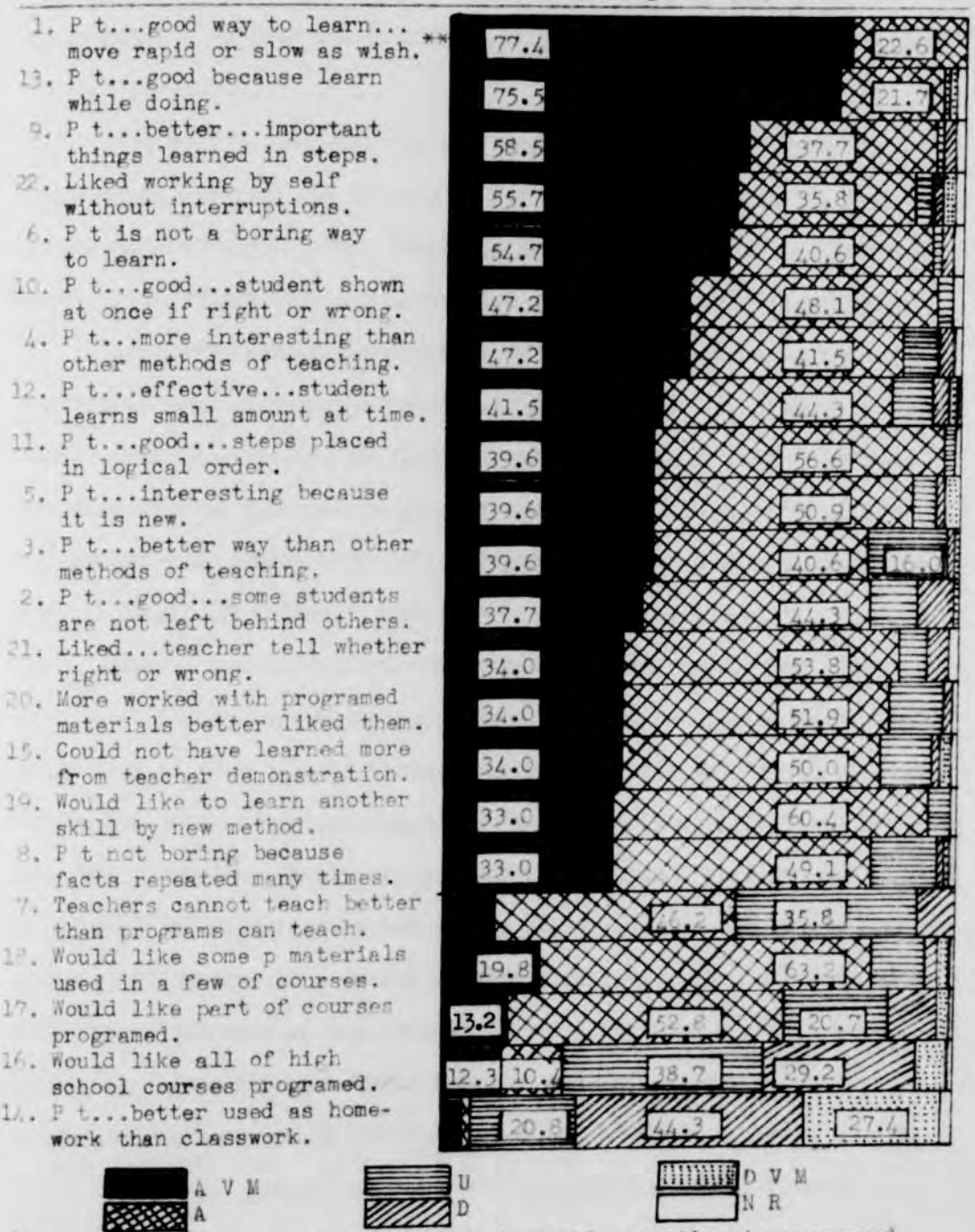
[8]One of the 107 students who completed the program did not complete the Student Reaction Form.

Figure 1

STUDENT REACTION TO PROGRAMED TEACHING*



* The items are arranged in order of favorable reaction to programed teaching.

**Items in this table are abbreviated.

Figure 1

STUDENT REACTION TO PROGRAMED TEACHING*

Item	Statements of Attitude	Percentage of Responses
1.	P t...good way to learn... move rapid or slow as wish.**	77.4 / 22.6
13.	P t...good because learn while doing.	75.5 / 21.7
9.	P t...better...important things learned in steps.	58.5 / 37.7
22.	Liked working by self without interruptions.	55.7 / 35.8
6.	P t is not a boring way to learn.	54.7 / 40.6
10.	P t...good...student shown at once if right or wrong.	47.2 / 48.1
4.	P t...more interesting than other methods of teaching.	47.2 / 41.5
12.	P t...effective...student learns small amount at time.	41.5 / 44.3
11.	P t...good...steps placed in logical order.	39.6 / 56.6
5.	P t...interesting because it is new.	39.6 / 50.9
3.	P t...better way than other methods of teaching.	39.6 / 40.6 / 16.0
2.	P t...good...some students are not left behind others.	37.7 / 44.3
21.	Liked...teacher tell whether right or wrong.	34.0 / 53.8
20.	More worked with programed materials better liked them.	34.0 / 51.9
15.	Could not have learned more from teacher demonstration.	34.0 / 50.0
19.	Would like to learn another skill by new method.	33.0 / 60.4
8.	P t not boring because facts repeated many times.	33.0 / 49.1
7.	Teachers cannot teach better than programs can teach.	16.2 / 35.8
18.	Would like some p materials used in a few of courses.	19.8 / 63.2
17.	Would like part of courses programed.	13.2 / 52.8 / 20.7
16.	Would like all of high school courses programed.	12.3 / 10.4 / 38.7 / 29.2
14.	P t...better used as home-work than classwork.	20.8 / 44.3 / 27.4

A V M
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* The items are arranged in order of favorable reaction to programed teaching.

**Items in this table are abbreviated.

checked their response to this item in the "agree very much" column.

More than 90 percent of the students said that they liked working by themselves without interruptions, item 22. Only 8 percent disagreed or were uncertain.

Two of the 106 students, 1.9 percent, thought that "programed teaching is a boring way to learn," item 6. More than half of the students, about 55 percent, disagreed very much with this statement, indicating that they were not bored when they learned by this method.

Approximately an equal number of the students agreed very much and agreed that" programed teaching is good because the student is shown immediately if an answer is right or wrong," item 10; that "programed teaching is good because the steps are placed in logical order," item 11; and that the programed method "is effective because the student learns a small amount at a time," item 12.

Items 3 and 4 required that students compare programed teaching with other methods of teaching. Students showed more uncertainty in responding to item 3, that "programed teaching is a better way to learn than other methods of teaching," than to item 4, that "programed teaching is more interesting than other methods of teaching." Sixteen percent were uncertain that this is a better way to learn and approximately 9 percent were uncertain that this method is more interesting than other methods. More than 80 percent of the students agreed with both of these items. Students also agreed that their interest and favorableness toward programed teaching can be attributed partially to its newness, item 5.

Eighty-two percent agreed that "programed teaching is good because some students are not left behind other students in the class."

Seventeen percent of the students were uncertain or disagreed with item 2.

The majority of students, 88 percent, indicated that they liked having the teacher reinforce performance frames, item 21. Only 5 percent disagreed with this item, and 6 percent were uncertain.

Eighty-four percent of the students disagreed that they "could have learned more about the sewing machine from teacher demonstrations," item 15. Fifteen percent either agreed or were uncertain in responding to this item. Ninety-three percent of the students expressed a desire to learn another skill by this new method, item 19.

Students indicated that the repetition of facts in the program was not boring by disagreeing with item 8. Only 5.6 percent of the students agreed with the statement. Many students reacted with uncertainty toward item 7, "teachers can teach better than a program can teach."

Even though the students reacted favorably toward programed instruction, they were uncertain about its future use in high school classes. Thirty-eight percent of the students were uncertain that they would like all of their high school courses programed, item 16; 38 percent of the students disagreed with this statement. Sixty-six percent of the students agreed that having part of their courses programed would be desireable, item 17. Eighty-three percent of the students agreed that they would like to have some programed materials used in a few courses, item 18. However, 72 percent disagreed that programed teaching would be better used as home work than in the classroom, item 14. Forty-four percent of the students disagreed with this statement, 27 percent

disagreed very much, and 21 percent were uncertain about their reaction. Only 6 percent of the respondents agreed with item 14.

Of all the 22 items in the Student Reaction Form there were only two items, 14 and 16, toward which there was more disagreement than agreement toward programed teaching. It can be concluded that students reacted favorably toward the Sewing Machine Program and the programed instruction method.

Comparison of High and Low Achieving Students

The students in the three achievement groups were compared with respect to the median time used to complete the program, the median errors on the response frames, the median errors on the criterion performance test, and the reactions to programed teaching.

The median time for all students to complete the program was 252.2 minutes (see Table 2). Students with the lowest grade point averages, Group 3, had a mean time slightly more than one hour longer than did students with the highest grade point averages, Group 1.

The median number of errors on response frames was calculated for each achievement group (see Table 2). Students in Group 3 averaged twice as many errors as did students in Group 1. Students in Group 2 were at approximately a mid point between Groups 1 and 3 with respect to the average number of errors on the program.

The median number of errors on the criterion performance test was 2.5 (see Table 2). Students in Group 3 averaged more than four times as many errors as did students in Group 1.

Students in progressively lower achievement groups required a progressively longer time to complete the program; they made progressively

more errors on the program; and they made progressively more errors on the criterion performance test.

TABLE 2

MEDIAN TIME USED TO COMPLETE THE PROGRAM, MEDIAN ERRORS ON RESPONSE FRAMES, AND MEDIAN ERRORS ON THE CRITERION PERFORMANCE TEST OF STUDENTS GROUPED ACCORDING TO SCHOOL ACHIEVEMENT

Groups*	N	Time in Minutes	Program Errors	Criterion Performance Test Errors
1	24	217.5	7.0	1.0
2	53	252.5	10.0	2.0
3	30	286.5	14.0	4.5
	107	252.2	10.3	2.5

*Group 1 grade point average 93 - 100
Group 2 grade point average 80 - 92
Group 3 grade point average 79 and below

Statements to which there was approximately a 20 percent difference between reactions of students in any two of the achievement groups were chosen for comparison. The 11 items showing differences between the groups were 1, 6, 4, 12, 3, 21, 15, 8, 7, 16, and 14.

Students in progressively higher achievement groups agreed more strongly with the statement that "programed teaching is a good way to learn because students can move as rapidly or as slowly as they wish." Eighty-seven percent of the students in Group 1 agreed very much with item 1, whereas only 67 percent of Group 3 agreed very much with this item (see Figure 2).[9]

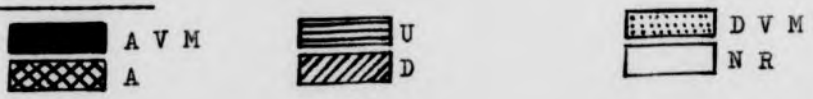
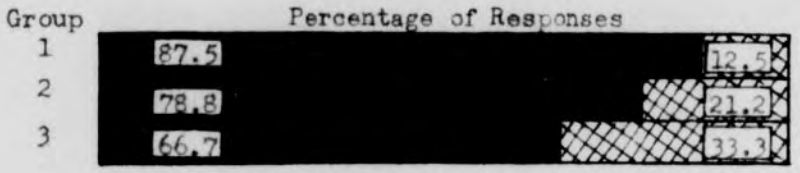
9 

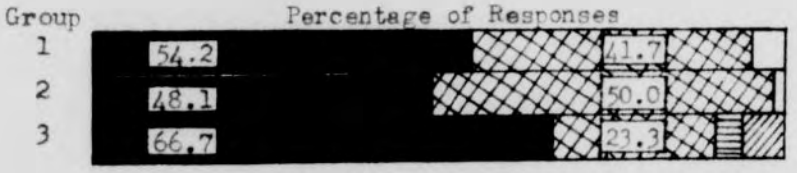
Figure 2



1. Programed teaching is a good way to learn because students can move as rapidly or as slowly as they wish.

A higher percentage (67) of the students in Group 3 than students in Groups 1 and 2 (see Figure 3) agreed very much with item 6,"programed teaching is not a boring way to learn."[10]

Figure 3



6. Programed teaching is not a boring way to learn.

In the first and third groups 58 and 57 percent of the students were in agreement that programed teaching is more interesting than other methods of teaching, item 4 (see Figure 4). Fewer students in Group 2 agreed very much with this item.

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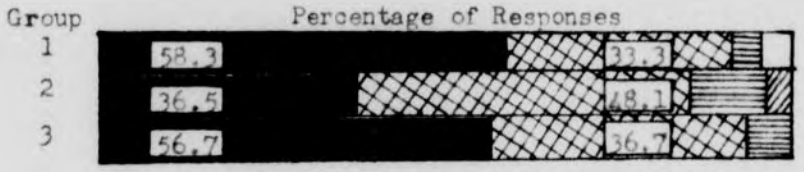
[10]Items 6, 15, 8, and 7 were reworded for graphical presentation so that "agree very much" indicated a favorable reaction toward programed instruction.

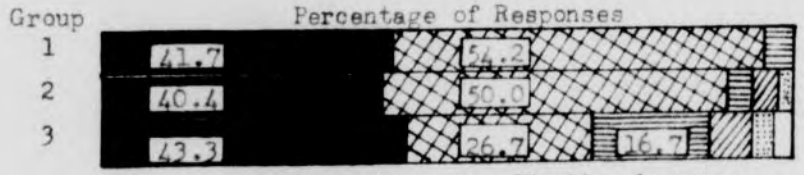
Figure 4



4. Programed teaching is more interesting than other methods of teaching.

There was little difference among students of the three groups in the number who responded "agree very much" to item 12, "programed teaching is effective because the student learns a small amount at a time" (see Figure 5). Half as many students in Group 3 agreed with the statement as did students in Groups 1 and 2.

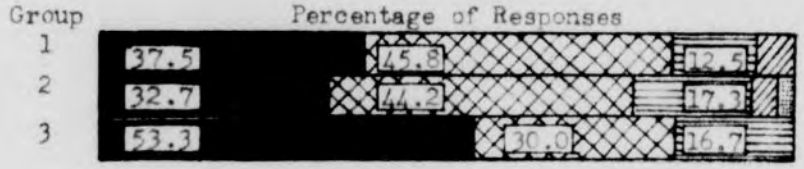
Figure 5



12. Programed teaching is effective because the student learns a small amount at a time.

The comparison of the responses to item 3, "programed teaching is a better way to learn than other methods of teaching," indicated that 53 percent of the students in Group 3 agreed very much whereas 38 and 32 percent in Groups 1 and 2 agreed very much. Students in Group 3 did not indicate disagreement toward this item (see Figure 6).

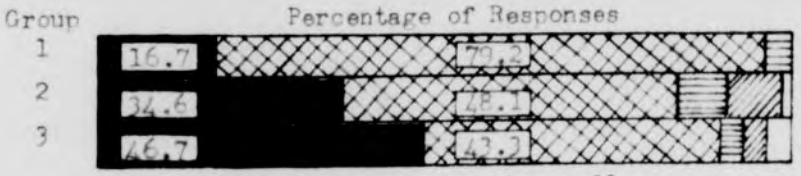
Figure 6



3. Programed teaching is a better way to learn than other methods of teaching.

A considerably larger percentage of the low achieving students, Group 3, agreed strongly that they liked having the teacher tell them whether a step had been completed correctly or incorrectly (see Figure 7).

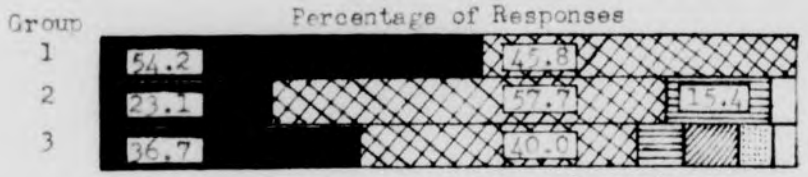
Figure 7



21. I liked having the teacher tell me whether some step had been completed correctly or incorrectly--it gave me a feeling of accomplishment.

All of the students in Group 1, the high achieving students, indicated that they thought they learned more from the program than they could have learned from a teacher demonstration, item 15. Twenty-three percent in Group 2 as compared with 54 percent in Group 1 agreed very much with this item. Only about 6 percent of the students in Group 3 indicated that they thought they could have learned more about the sewing machine from a teacher demonstration (see Figure 8).

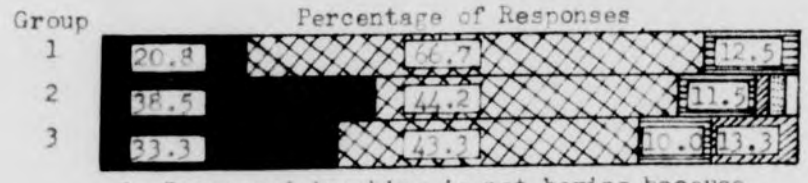
Figure 8



15. I believe I could not have learned more about the sewing machine from teacher demonstrations.

In Group 1, 67 percent marked "agree" and 21 percent marked "agree very much" that "programed teaching is not boring because the facts are repeated too many times," item 8. In Group 3, a smaller percentage of students checked in the "agree" column and a larger percentage checked in the "agree very much" column (see Figure 9).

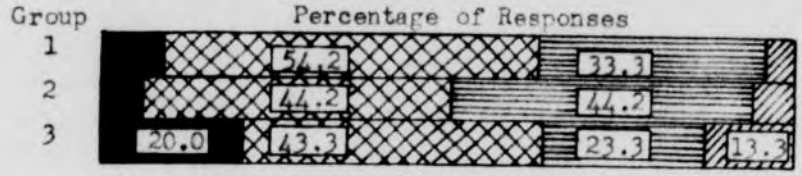
Figure 9



8. Programed teaching is not boring because the facts are repeated too many times.

Twenty percent of the students in Group 3 agreed very much with item 7 (see Figure 10) that teachers cannot teach better than programs whereas only 8 and 6 percent respectively in the other two groups marked "agree." Twice as many students proportionately in Group 2 as in Group 3 were uncertain about their response to this item.

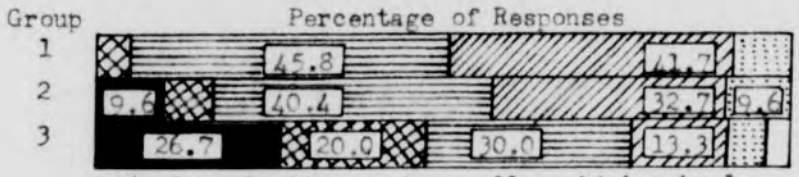
Figure 10



7. Teachers cannot teach better than a program can teach.

Students in Group 3 felt more strongly than did the students in Group 2 that they would like all of their courses programed, item 16. None of the students in Group 1 agreed very much with this item, but approximately 88 percent were either uncertain or disagreed (see Figure 11).

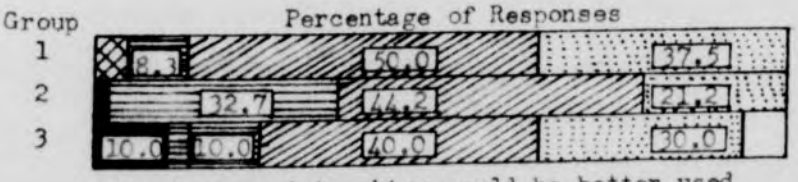
Figure 11



16. I would like to have all my high school courses programed.

Except for 13 percent of the students in Group 3 and 2 percent in Group 2, students reacted unfavorably to item 14 that "programed teaching would be better used as home work than in the classroom" (see Figure 12).

Figure 12



14. Programed teaching would be better used as homework than in the classroom.

If the responses in the "agree very much" and "agree" columns are added, there is very little difference among the three groups. An exception to this statement is item 16.

Teacher Reaction Interview

Within six to eight weeks after the completion of the field testing, the researcher informally interviewed the four teachers participating in the study. The Teacher Reaction Interview Record (see Appendix D) was used as a guide for presenting questions concerning (a) the problems teachers have in administering the programed materials, (b) the desirability of selected students reinforcing performance frames, (c) the effectiveness of teacher administration when they also have the responsibility for the guidance of the work of the portion of the class not using the program, and (d) the revisions the teachers thought should be made in the Sewing Machine Program and in the supplementary materials.

The teachers had been asked to observe how the students worked during the portion of the clothing unit which followed the completion of the Sewing Machine Program. The teachers had had previous experience in teaching home economics and were able to compare these students with students in previous first-year home economics clothing classes which had not used the program. The four teachers indicated that the students worked individually at the sewing machines more efficiently than did students in previous home economics classes. Throughout the clothing units all of the students were able to thread the machine, to adjust tension fairly accurately, and to replace broken needles without securing the help of the teacher or another student. In previous classes teachers had frequently been asked to replace a needle and to make other machine

adjustments. The students who had used the program also worked faster at the machines.

Two teachers felt that the students learned to work more independently. Because of this ability to operate the machine independently, many students actually did not wish to have a partner. This is contrasted with previous classes in which students depended on other classmates for information so that the teacher would not be aware of their inability to perform certain tasks at the machine.

All of the teachers reported a decrease in broken machine needles with classes who had used the program. There was also a decrease in problems, such as adjusting the tension regulator, winding the bobbin, and replacing the needle.

As a result of the students' ability to correctly operate a sewing machine, the teachers had more time available to work with construction problems. More time was also allowed for each student to have individual help from the teacher.

A longer time was spent on learning to use the machine by the programed method than the teachers had previously used in demonstrations. The time required to complete the program did not concern the teachers because they thought that the program had presented the material more effectively than they themselves had presented it in previous demonstrations.

The teachers agreed that students had more skill in using the machine at the end of the clothing unit than students had shown in previous classes. Increased skill in adjusting machine parts as well as in operating the machine was noticeable.

The teachers pointed out the value of having some previously trained students reinforce frames. Two teachers indicated that this procedure frees the teacher to guide other students who may not be using a program. One teacher felt that the student assistants gained a sense of responsibility through such an experience and that this procedure is a type of student motivation. When two assistants are used, the frames are reinforced more rapidly, and students proceeding through the program are less likely to have to wait for their work to be checked. If several students are completing a program during the same class period, one reinforcer might have difficulty in seeing all of the students.

Two teachers thought some problems might occur when student assistants are used. The students at the machines could be misled if questions arose that the assistant was unable to answer because of limited experience. Also the student helpers might overlook mistakes; consequently, an error might be reinforced.

All of the teachers said they had learned many things which would aid them in future administration of the program. Two of the teachers suggested slight changes in the procedure. One teacher said she would plan to have two girls work at each machine. Another teacher thought the procedure could be improved by issuing materials and supplies to the students when they are ready to work at the machines. This would eliminate preliminary preparation by the teacher. A third teacher desired programs or other individual work for the students not working on the Sewing Machine Program.

The teachers in the study indicated that they clearly understood the "Instructions to the Teacher" and agreed that sufficient information

was included to enable them to use the program. One teacher suggested the following changes in the format of the instructions:

1. Plan the equipment list so that it will be usable as a check list for preparing or issuing the equipment
2. Plan the equipment list and the instructions for preparing the machines separately from the general information about the Sewing Machine Program
3. Change the "Instructions to the Teacher" to an outline form
4. Type main headings in capital letters to separate the general information section from the section describing the preparation of the equipment and supplies
5. Suggest that the teacher compute and note on the instruction sheet the total amount of equipment to be prepared for each student by multiplying the items needed by the number of students to be using the programs

The writer incorporated the preceding suggestions in the plan for the revised Instructions to the Teacher, which is included in Appendix F.

Three of the teachers indicated that programed instruction could be used in the home economics classes at various times for remedial work, regular instruction, and enrichment. One teacher believed that programed instruction would best be used for remedial work and for enrichment. This same teacher decided that the most desirable use for programed instruction would be for homework. One teacher thought programed instruction would be more applicable to homework because the students could prepare for labs and field trips by learning the basic factual information at home. Two other teachers preferred to use programs for

classwork only. One teacher thought that either programed homework or classwork would be desirable on various occasions. The teachers indicated that the present edition of the Sewing Machine Program could not be easily used for homework because of the different machine models in the students' homes.

Three teachers readily expressed the desire to use the Sewing Machine Program with classes next year if it is available and if they could budget department funds to purchase the materials. The fourth teacher would not choose to use the program next year because of the length of time required to complete the materials; however, she did indicate willingness to use the program if other programed materials were available for use by students who were not working at the machines.

All of the teachers indicated that they would like to have more home economics programs available, and they suggested the following areas of clothing, housing, foods, and child development:

1. Principles of nutrition presented through a program in such a way as to create interest in the area as well as to provide some basic facts
2. Art principles which may be applied to housing and clothing
3. Stages of growth in child development
4. Grooming, with basic rules for the application of make-up emphasized
5. Use, cleaning, and storage of small electrical appliances
6. Principles of measuring
7. Understanding of a simple blouse pattern
8. Basic clothing construction principles

The four teachers had carefully evaluated the programed materials on the sewing machine as students were using them, and they made the following suggestions for further improvement:

1. Write sections of frames about
   a. operating the treadle sewing machine
   b. opening and closing the sewing machine
   c. storing and installing the electrical cord
   d. operating the knee or foot control
   e. backstitching by reversing the lever on the stitch-length regulator
   f. using the thread cutter
   g. adjusting the two-sided zipper foot
2. Expand the sections of frames on adjusting tension, removing the bobbin case, and applying tape guide lines to the machine
3. Construct answer booklets for each model of sewing machine or explain how to follow the color listed in the original answer booklet
4. Write supplementary sections for advanced students on the use of the sewing machine attachments

CHAPTER V

SUMMARY AND RECOMMENDATIONS

Summary

The purposes of this study were to revise and field test the self-instructional program on the sewing machine. The revision of the Sewing Machine Program was prepared from recommendations by Moore (16) based on the findings of the preliminary field test and recommendations by the staff in Home Economics Education. These recommendations and a revision of the objectives of the Sewing Machine Program provided the guide for the new edition of the Sewing Machine Program. Major revisions were the addition of (a) performance frames, (b) sections of frames for objectives not previously programed, (c) separate colored frames for various models of sewing machines, and (d) an introduction to programed instruction for the students. A number of illustrations were redrawn and new illustrations were added.

Each program consisted of 340 frames. These frames were lithoprinted, three on a standard size page. Pages were cut, the answer portions of the page folded back, and two holes punched in each frame. These were assembled into two booklets each of which was held together with two rings. Heavy paper covers protected the frames.

The following supplementary materials were developed to accompany the program for field testing: (a) an answer booklet with ruled spaces in which the student wrote her responses, (b) a time and error record,

(c) a student information questionnaire, (d) a student reaction form, and (d) a teacher reaction interview record.

Four schools in the proximity of Greensboro were selected to participate in the study. The 108 female students who proceeded through the Sewing Machine Program were enrolled in a first-year home economics class. Grade point averages were secured for each student so that comparisons could be made among the high and low achieving students.

Since sewing machines were available for only half of the class in three of the schools, the teacher had the responsibility for providing instruction for the portion of the class not using the program. In two schools the researcher administered the program while the teacher taught the other half of the class. In the third school, two student assistants reinforced frames while the teacher taught the portion of the class not using the program. In the fourth school the teacher administered the program to the whole group with the assistance of two previously trained students. After the completion of the program, the students responded to a criterion performance test and a student reaction record.

The findings of the field test indicated that students averaged 12.0 errors on the program, a 3.6 percent error rate. Students averaged 3.1 errors on the criterion performance test, an 8.0 percent error rate. The correlation coefficient between these two measures was significantly different from zero, $\pm$ .244. The mean time required to complete the Sewing Machine Program was 256.8 minutes or approximately five 55-minute class periods. Comparisons of the high and low achieving students indicated that students in the lower achievement group required a longer time to complete the program and made more errors on the program and on

the criterion performance test. In general, reactions to programed teaching and to the Sewing Machine Program were favorable in all three achievement groups.

The teachers who were interviewed after the termination of the field test indicated that as a result of the program the participating students worked individually at the machines with more efficiency than students in previous home economics classes had worked. Also, the teachers encountered fewer machine adjustment problems; consequently, they had more time available to work with the students on construction problems. The use of student assistants to reinforce performance frames freed the teacher to work with students who were not using the program.

The teachers suggested that programed instruction might be used at various times in the home economics class for remedial work, regular instruction, and enrichment. They indicated interest in programed instruction and the desire to have more programs available in several areas of home economics.

Recommendations

Revising the Sewing Machine Program and Supplementary Materials

The following revisions or suggestions are recommended for further improvement of the Sewing Machine Program:

1. Have the field test data and the program evaluated by a professional programer
2. Write sections of frames about
   a. opening and closing the sewing machine
   b. storing and installing the electrical cord

c. operating the knee or foot control

d. backstitching by reversing the lever on the stitch-length regulator

e. using the thread cutter

f. adjusting the two-sided zipper foot

3. Improve the wording or the illustrations or write lead-up frames in cases where there is an error rate of 10 percent or more
4. Include only one method of testing tension
5. Write supplementary sections for additional models of sewing machines
6. Consider omitting some teacher reinforcement of responses
7. Improve the panel diagram of the sewing machine

Classroom Administration of the Sewing Machine Program

The following additions to the Instructions to the Teachers are recommended for use in administering the Sewing Machine Program:

1. Provide a ruled space on the answer booklet cover in which the student will write the color of the program frame insertions. Include a frame in the introductory section of the program to direct the student to make this response
2. Use other home economics programs, if available, for the portion of the class for whom sewing machines are not available
3. Use student assistants to help in reinforcing performance frames

Research Involving the Sewing Machine Program

The following research involving the Sewing Machine Program is recommended:

1. Develop the following self-instructional programs to be used in clothing units preceding or following the Sewing Machine Program:
   a. textiles
   b. selection and care of fabrics
   c. clothing selection
2. Compare the students who completed the Sewing Machine Program and students who observed demonstrations by a teacher with respect to:
   a. scores on the criterion performance test
   b. scores on an objective paper-and-pencil test
   c. responses on a student reaction questionnaire
   d. ability to generalize and transfer learnings to another sewing machine model
3. Compare students who had been taught to use a sewing machine one year earlier (1) by the Sewing Machine Program and (2) by teacher demonstrations with respect to:
   a. scores on the criterion performance test
   b. scores on an objective paper-and-pencil test
   c. responses on a student reaction questionnaire
   d. ability to generalize and transfer learnings to another sewing machine model

4. Develop a self-instructional program on the sewing machine for educable mentally retarded boys and girls
5. Suggest classroom experiences in which learnings from the program will be transferred to a new task or used to achieve objectives at the analysis, synthesis or judgement level

LIST OF REFERENCES

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1. COCHRAN, LEE W. Summary Report of the Eighth Lake Okoboji Audiovisual Leadership Conference. Washington, D. C.: National Education Association Department of Audiovisual Instruction and the Extension Division of the State University of Iowa, 1962. 100 pp.

2. COOK, JOHN O. and MILLER, HOWARD G. A Guide to Curriculum Study: Programed Learning. Raleigh, North Carolina: State Board of Education, 1962. 64 pp.

3. COULSON, JOHN E. Programed Instruction: A Perspective. Santa Monica, California: System Development Corporation. June 27, 1962. Paper, 11 pp.

4. CRONBACH, LEE J. "Programed Instruction." NEA Journal. December, 1962. pp. 45-47.

5. DETERLINE, WILLIAM A. An Introduction to Programed Instruction. Englewood Cliffs, New Jersey: Prentice-Hall, 1962. 131 pp.

6. FILEP, ROBERT T. (ed.), "The Potential Impact of Programed Instruction on the Curriculum and Counseling." Prospectives in Programing. New York: The Macmillan Company, 1963. pp. 170-189.

7. FRY, EDWARD B. Teaching Machines and Programed Instruction. New York: McGraw-Hill Book Company, Inc., 1963. 244 pp.

8. HUFFMAN, SALLY. "Home Economics Teachers and Programed Instruction: An Exploratory Study." Unpublished Master's thesis. University of North Carolina at Greensboro. 1963.

9. JOOS, L. W. "Problems Posed by Programed Materials." Towson, Maryland: Board of Education of Baltimore County, 1962. 3 pp. (Mimeo.)

10. KLAUS, DAVID J. "Programed Instruction in High School Physics." Report of research carried out at the American Institute for Research and sponsored by a grant from the United States Office of Education, Department of Health, Education, and Welfare, under Title VII of the National Defense Education Act. Pennsylvania: American Institute for Research, 1962. 5 pp. (Mimeo.)

11. KNIRK, F. G. "Reflections on the Use of Programs." Audiovisual Education 8: 97-98, February, 1963.

12. KOMOSKI, P. KENNETH. "Programed Instruction and Its Place in Education." New York: Center for Programed Instruction (365 West End Avenue), 1960. 16 pp. (Offset)

13. LYSAUGHT, JEROME P. and WILLIAMS, CLARENCE M. A Guide to Programed Instruction. New York: John Wiley and Sons, Inc., 1963. 180 pp.

14. MARGULIES, STUART and EIGEN, LEWIS D. Applied Programed Instruction. New York: John Wiley and Sons, Inc., 1962. 387 pp.

15. MILLS, ANNICE L. "Programmed Learning and the Educational Process." New York: Thomas Alva Edison Foundation, Inc., 1961. 24 pp.

16. MOORE, CATHERINE PORTER. "Development of a Self-Instructional Program on the Sewing Machine." Unpublished Master's thesis. Greensboro: The Woman's College of the University of North Carolina, 1963.

17. PROBST, GEORGE E. Programed Learning in the Schools: Tasks for 1962. New York: Thomas Alva Edison Foundation, Inc., 1962. 24 pp.

18. SILBERMAN, HARRY F. "Trends in Programed Instruction--an Improvement in Educational Technology." Prospectives in Programing, ed. Robert T. Filep. New York: The Macmillan Company, 1963. 324 pp.

19. SKINNER, B. F. "Teaching Machines." Teaching Machines and Programed Learning: A Source Book, ed. A. A. Lumsdaine and Robert Glaser. Washington, D. C.: National Education Association Department of Audio-Visual Instruction, 1960. pp. 137-158.

20. STOLUROW, LAWRENCE M. Teaching by Machine. U. S. Department of Health, Education, and Welfare, Office of Education, Cooperative Research Monograph No. 6. Washington, D. C.: Superintendent of Documents, Government Printing Office, 1961. pp. 145-149.

21. TUCKER, JOSEPH A., JR. "The Administrator and New Instructional Media." Prospectives in Programing, ed. Robert T. Filep. New York: The Macmillan Company, 1963. pp. 163-169.

22. THE CENTER FOR PROGRAMED INSTRUCTION AND U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE. The Use of Programed Instruction in the U. S. Schools: Report of a Survey of the Use of Programed Instructional Materials in the Public Schools of the United States During the Year 1961-62. Washington, D. C.: U. S. Government Printing Office, 1963. 83 pp.

23. WILLIAMS, CLARENCE M. "Information Disseminator or Guide of Learning?— Training the Teacher for the Classroom of the '70's." Prospectives in Programing, ed. by Robert T. Filep. New York: The Macmillan Company, 1963. pp. 153-162.

APPENDIX A

PREPARING STAFF AND STUDENTS FOR PROGRAMED INSTRUCTION

PREPARING STAFF AND STUDENTS FOR PROGRAMED INSTRUCTION

References Recommended by Huffman (8, pp. 9-18).

1. An Overview of Programed Instruction

LEONARD, GEORGE B. "Revolution in Education," Look. Vol. 26, no. 12, June 5, 1962. p. 58ff.

FINE, BENJAMIN. Teaching Machines. New York: Sterling, 1962. 176 pp.

SCHRAMM, WILBUR. Programed Instruction Today and Tomorrow. The Fund for Advancement of Education, Ford Foundation. November, 1962. 74 pp.

2. Underlying Principles of Programing

DETERLINE, WILLIAM A. An Introduction to Programed Instruction. Englewood Cliffs, New Jersey: Prentice-Hall, 1962. 131 pp.

MILTON, OHMER AND WEST, LEONARD J. Programed Instruction: What It Is and How It Works. New York: Harcourt, Brace and World, Inc., 1962. 32 pp.

CRAM, DAVID. Explaining "Teaching Machines" and Programming. San Francisco: Fearon, 1961. 86 pp.

3. Creating A Program

THE CENTER FOR PROGRAMED INSTRUCTION AND THE U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE. Programs '62: A Guide to Programed Instructional Materials Available to Educators by September 1962. Washington, D. C.: U. S. Government Printing Office, 1962. 383 pp.

Programs '63 is now available. The writer suggests this edition since it includes program listings from 1962 along with the new materials.

MAGER, ROBERT F. Preparing Objectives for Programed Instruction. San Francisco: Fearon, 1962. 62 pp.

GILBERT, THOMAS F. "On the Relevance of Laboratory Investigation of Learning to Self-Instructional Programming," Teaching Machines and Programed Learning: A Source Book. Washington, D. C.: National Education Association Department of Audio-Visual Instruction, 1960. pp. 477-81.

MARKLE, SUSAN M. EIGEN, LEWIS D. and KOMASKI, P. KENNETH. A Programed Primer on Programing, Vols. I and II. New York: Center for Programed Instruction, Inc., 1961. 72 pp.

LYSAUGHT, JEROME P. and WILLIAMS, CLARENCE M. A Guide to Programed Instruction. New York: John Wiley and Sons, Inc., 1963. 180 pp.

4. Using Programed Instruction

LYSAUGHT, JEROME P. and WILLIAMS, CLARENCE M. A Guide to Programed Instruction. New York: John Wiley and Sons, Inc., 1963. 180 pp.

GALANTER, EUGENE (ed.). Automatic Teaching: The State of the Art. New York: John Wiley and Sons, Inc., 1959. 198 pp.

LUMSDAINE, A. A. and GLASER, ROBERT (editors). Teaching Machines and Programed Learning: A Source Book. Washington, D. C.: National Education Association Department of Audio-Visual Instruction, 1960. 724 pp.

APPENDIX B

REVISED OBJECTIVES OF THE SEWING MACHINE PROGRAM

THE SEWING MACHINE PROGRAM

OVERALL OBJECTIVE:

The learner will acquire a knowledge of and skill in the use of one of the following models of Singer sewing machines: 66, 15-91, 301, 201, and 404.

MAJOR OBJECTIVES:

1. The learner upon completion of the program, will be able to identify, locate, and verbalize the function of the following parts:

bobbin	presser-foot bar
bobbin case	presser-foot lifter
bobbin winder	slide plate
feed dog	spool pin
foot control	stitch-length regulator
hand wheel	stop-motion screw
knee control	tension regulator
needle	thread guides
needle bar	thread take-up
presser foot	treadle

2. The learner will be able to perform the following operations:

   a. thread upper parts of the machine
   b. wind bobbin
   c. thread underneath parts of the machine
   d. bring bobbin thread through hole in throat plate
   e. begin and stop stitching with thread, fabric, and all parts in proper position
   f. appraise stitching for medium weight fabric
   g. adjust tension
   h. adjust length of stitches
   i. remove presser foot and replace it with a zipper foot
   j. make varying widths of seams, using a guide
   k. turn a square corner with continuous stitching

APPENDIX C

THE SEWING MACHINE PROGRAM

DIAGRAM OF THE SEWING MACHINE

4

When you turn the page and find you have written an incorrect answer, reread the frame and find the correct information.

80

5

When the teacher indicates that you have done something incorrectly at the machine, go back as many frames as necessary to see where you made the mistake.

6

When the program asks you to do something at the machine and the teacher indicates that you have made a mistake, go back as many frames as necessary to find the correct procedure.

12

You will be asked to refer to a diagram on a number of the frames of this program. The diagram is the large chart of a sewing machine which accompanies the program.

81

no response

(no response)

13

Look at the diagram. Locate the spool pin and write down the number.

18

14

Locate the spool pin on the sewing machine. Place a spool of light colored thread on the spool pin.

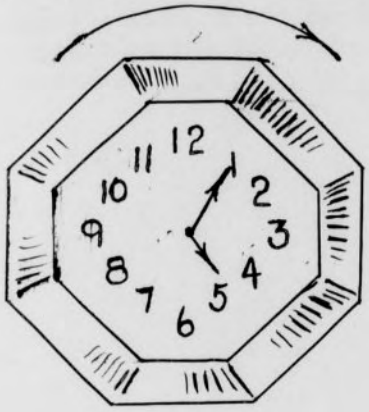
✓

Make a check (✓) on your paper when you have done this.

15

The hands of a clock move clockwise. The hands on this diagram move _____.

clockwise 82



16

To tighten a jar lid, one turns it clockwise. To remove a jar lid, one turns it counter clockwise. A lid is removed by turning it _____.

counter clockwise

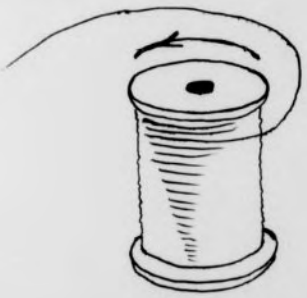
Clockwise

Counter Clockwise

17

When one is sewing, the spool of thread should turn counter clockwise. The spool must turn _____.

counter clockwise



22

On every machine, after the thread has been placed on the spool pin, it must be put through a thread guide. The first step after placing the thread on the spool pin is to put the thread through a _____ _____.

thread guide

23

There are many thread guides, but at the moment we are interested only in the one located after the spool pin.

There are_____thread guides.

many

24

Thread guides are always threaded easily by snapping or hooking thread into them.

(no response)

no response

25

Look at the sewing machine and locate the first thread guide. Bring thread from the spool pin and hook it into the first thread guide which is number 2 on the diagram.

Make a check (✓) on your paper when you have done this

26

A thread guide is used to help hold the thread in position. The thread guide holds _____.
(in your own words)

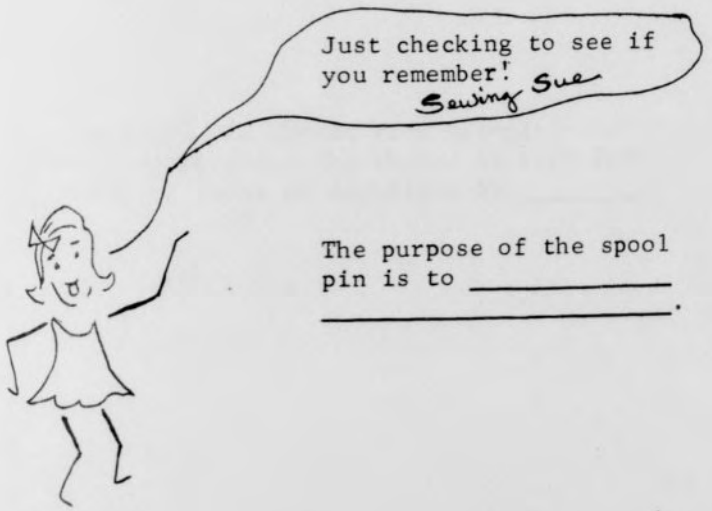
the thread in position

27

The purpose of each thread guide is to _____
_____.
(in your own words)

hold the thread in position

28



The purpose of the spool pin is to _____
_____.

hold the spool of thread.

On the diagram

86

18 is the _____ _____,

spool pin

2 is a _____ _____.

thread guide

30

Do you recognize this use of tension from advertisements?

Well, the tension you will learn about is somewhat different.

Read on to find out what it is!

(no response)

no response

31

Tension keeps the thread from becoming too loose or too tight. The thread is kept from becoming too loose or too tight by _____.

tension

68

The needle bar moves up and down with every stitch. With every stitch the_____
_____.
(in your own words)

87

needle bar
moves up and down

(or in your own words)

69

Locate the needle bar on the diagram and write the number on your paper. Locate the needle bar on the machine.

Make a check (✓) on your paper.

8

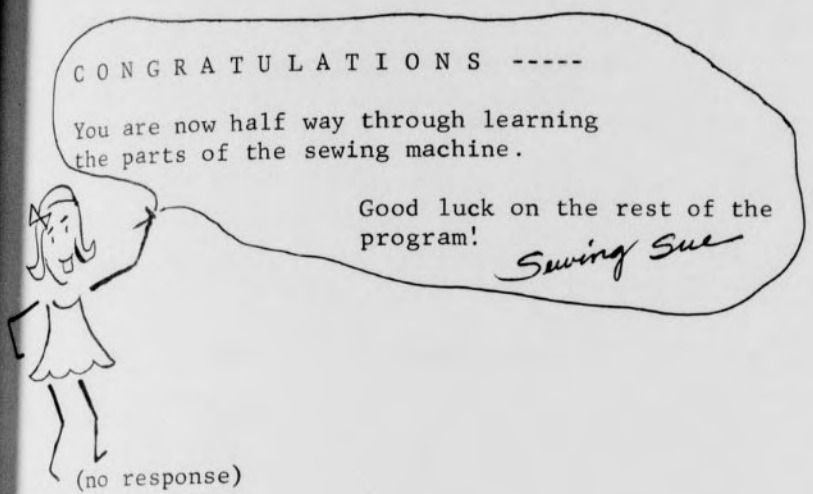
✓

70

Look at the diagram and identify the numbers below:

18_____
2_____
4_____
5_____
6_____
1_____
7_____

18 - spool pin
2 - thread guide
4 - tension regulator
5 - tension spring
6 - thread guide
1 - thread take-up
7 - thread guide



(no response)

88

no response

Locate the presser foot on the diagram. The presser foot is number 10.

Make a check (✓) on your paper.

✓

The "two-toed" foot that holds the cloth in place is a presser foot. The cloth is pressed in place by the _____ _____.

presser foot

74

Locate the presser foot on the machine.

Make a check (✓) on your paper.

89

75

As the sewing machine stitches, the cloth is held in place by the _____ _____.

presser foot

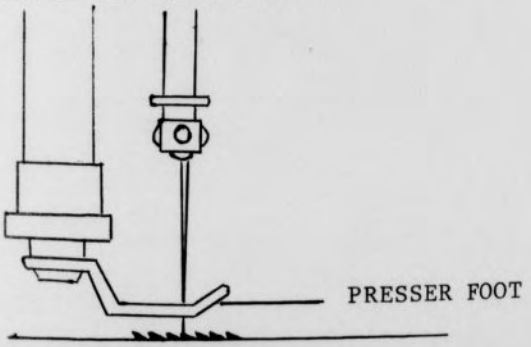
Did you call it "pressure" or "presser"?

PRESSER foot is correct.

76

The presser foot is attached to the presser-foot bar. Is the presser-foot bar behind or in front of the needle bar.

behind



SIDE VIEW

When driving a car, we start slowly and slow down before stopping. When operating a sewing maching, we also <u>start slowly and slow down before stopping</u>.

(no response)

90
no response

120

Now practice starting and stopping the machine.

<u>Stitch fast and stitch slowly</u>. ✓

Do this until you feel at ease starting slowly and slowing down, then stopping with your hand on the hand wheel for the last complete stitch.

121

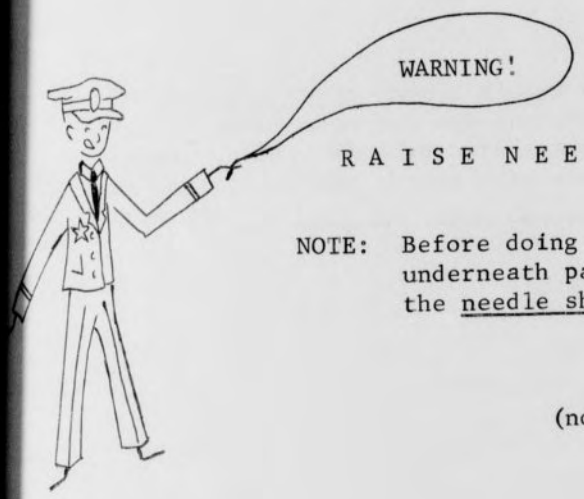
Repeat frames 112 through 120, stitching on paper. Stitch as straight as you can. guiding the paper with your left hand. ✓

You are now ready to learn about the part of the machine which does not usually show.

no response

(no response)

123



R A I S E N E E D L E

NOTE: Before doing anything with the underneath part of the machine, the <u>needle should be up</u>.

no response

(no response)

124

R E V I E W:

How can you raise the needle to its highest point?

(Describe in your own words.)

By turning hand wheel until the needle is at its highest point.

(or in your own words)

125

Did you raise the needle on your machine to its highest point?

yes

If not, raise it now.

126

The thread take-up should always be at the highest point when you are starting and ending a seam. When you are starting and ending a seam, the thread take-up should be at its _____ _____.

highest point

127

Many things are moving underneath the machine when you stitch. To observe this, you must move a part of the machine.

(no response)

no response

The part of the machine that is moved to see the underneath part of the machine is the_____ _____.

93

slide plate

The bobbin is a round object with one or more holes on the sides as illustrated. It is located under the slide plate. The bobbin is found under the _____ _____.

slide plate
or
bed extension

More than one hole OR One hole

BOBBINS

Every machine has a bobbin case. In some machines the bobbin case is stationary (it stays in the machine). In some machines the bobbin case is removed each time the underneath part of the machine is threaded.

no response

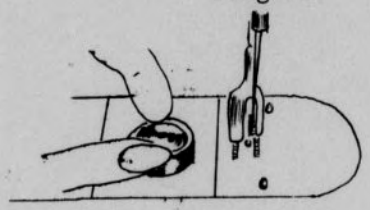
(no response)

The bobbin case in the machine at which you are working is stationary. 94

(no response) no response

TO REMOVE THE BOBBIN

Lift the bobbin from the bobbin case with two fingers.



STATIONARY BOBBIN CASE

You are now going to put thread on the empty bobbin by using directions on the next few frames. no response

(no response)

177

You will be given a rule that will help you to know how to thread the needle on <u>any</u> machine.

no response

(no response)

178

RULE: The thread enters the "eye" of the needle <u>from</u> the side that has the last thread guide.

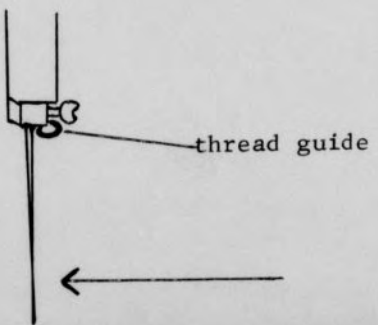
no response

(no response)

179

For example, if the last thread guide is on the right hand side of the needle bar, the needle is threaded from right to left.

no response



(no response)

180

The number of thread guides beyond the one which you have already threaded varies with models of machines.

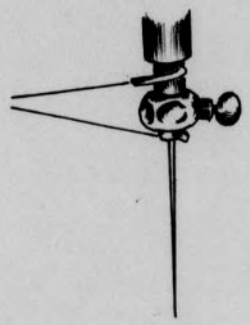
(no response)

no response 96

181

There are two thread guides near the needle of the machine at which you are working. Locate and thread these thread guides.

THREAD GUIDES



182

On which side of the needle bar is the last thread guide?

on the right side of the needle bar

192

When you are ready to stitch, both threads should be _____

_____.
(in your own words)

pulled back and between the toes of the presser foot

(or in your own words)

193

You are now ready to stitch on two thicknesses of cloth which your teacher has provided.

You will do this step by step.

Directions begin on the next frame.

(no response)

no response

194

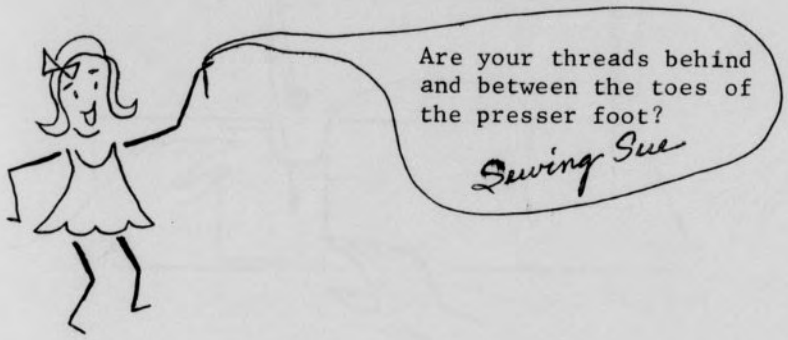
Turn the hand wheel <u>toward</u> <u>you</u> until the thread take-up and the needle are both at their highest points.

✓

195

98

Fold cloth lengthwise and place it under the presser foot so that the needle is about 5/8" from the right edge of the cloth.



196

Lower the needle by turning the hand wheel toward you.

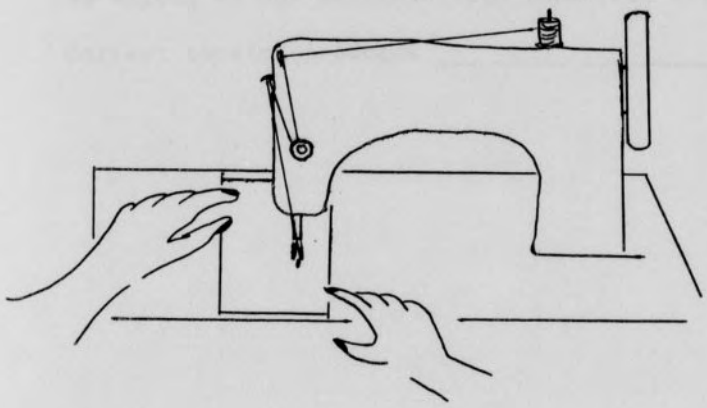
197

Lower the presser-foot lifter.

198

Guide cloth as illustrated.

99



199

Begin stitching by turning the hand wheel toward you and pressing <u>lightly</u> on the foot or knee control.

Stitch about 3 inches and stop.

Leave the cloth under the presser foot and read the next frame.

200

Stop with the thread take-up and the needle at their highest points, using the hand wheel for the last two or three stitches.

270

A seam stitched with correct tension is twice as strong as one stitched with incorrect tension. 100

Correct tension produces _____ _____. stronger seams

271

Hangnails on fingers make snags in hose.

Blunt needles make puckers in fabric. no response

(no response)

272

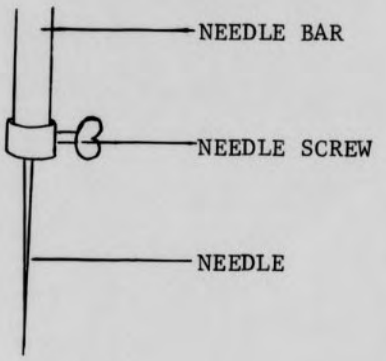
The sewing machine needle will have to be replaced if it breaks or gets dull, so you need to know how to put in a new needle.

(no response) no response

273

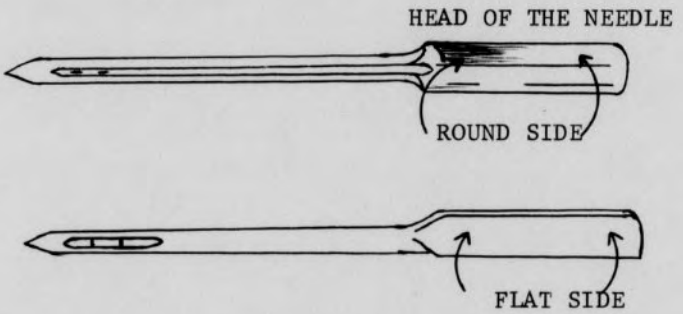
The sewing machine needle is removed by loosening the screw on the needle bar. Remove the needle from the machine at which you are working.

101



274

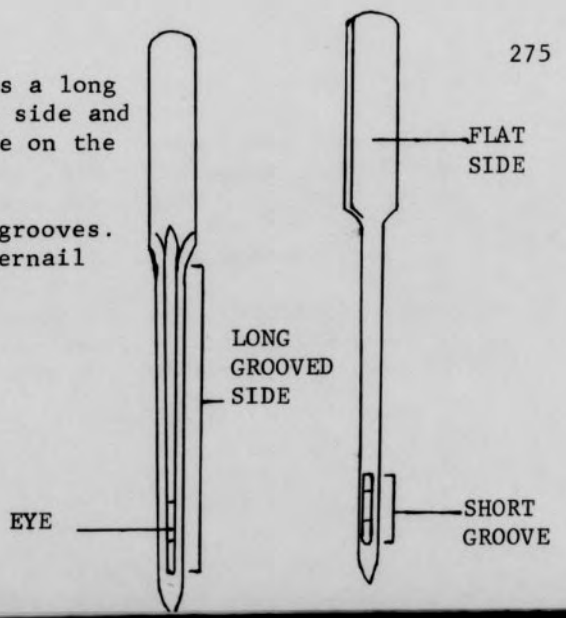
The head of a sewing machine needle has one flat side. Feel the round and the flat sides on the head of the needle you just removed.



275

The needle has a long groove on one side and a short groove on the other side.

Locate these grooves. Run your fingernail along them.



317

The seam guide line number 5 indicates a seam _____ inch wide. 5/8 102

Refer to the machine.

(Remember: Each interval is 1/8 inch.)

318

When one sews a seam, the raw edges of the cloth should follow along the desired seam guide line.

(no response) no response

319

To stitch a 1/4-inch seam, place two pieces of cloth together; place the upper right corner next to the 1/4-inch seam guide line; keep the raw edges of the fabric along the guide line; lower the needle; then lower the presser foot. no response

Remember: The spaces are divided into 1/8 inch intervals, so change the fraction to eighths. (1/4-inch seam equals 2/8.)

(no response)

Keep the edges of the fabric against the seam guide line while stitching. Stitch six inches and remove the fabric from the machine.

✓ 103

Did you remember to stop the machine with your hand on the hand wheel, to stop with the needle at its highest point, and to pull the fabric to the back before cutting the threads?

yes

yes

yes

322

Measure the finished seam with a ruler. How wide is it?

104

Congratulations if it is 1/4 inch.

Please call the teacher for further help if it is not 1/4 inch.

323

To stitch a 1/2-inch seam, place two pieces of cloth together; place the raw edges on the 1/2-inch guide line; lower the needle; then lower the presser foot.

✓

324

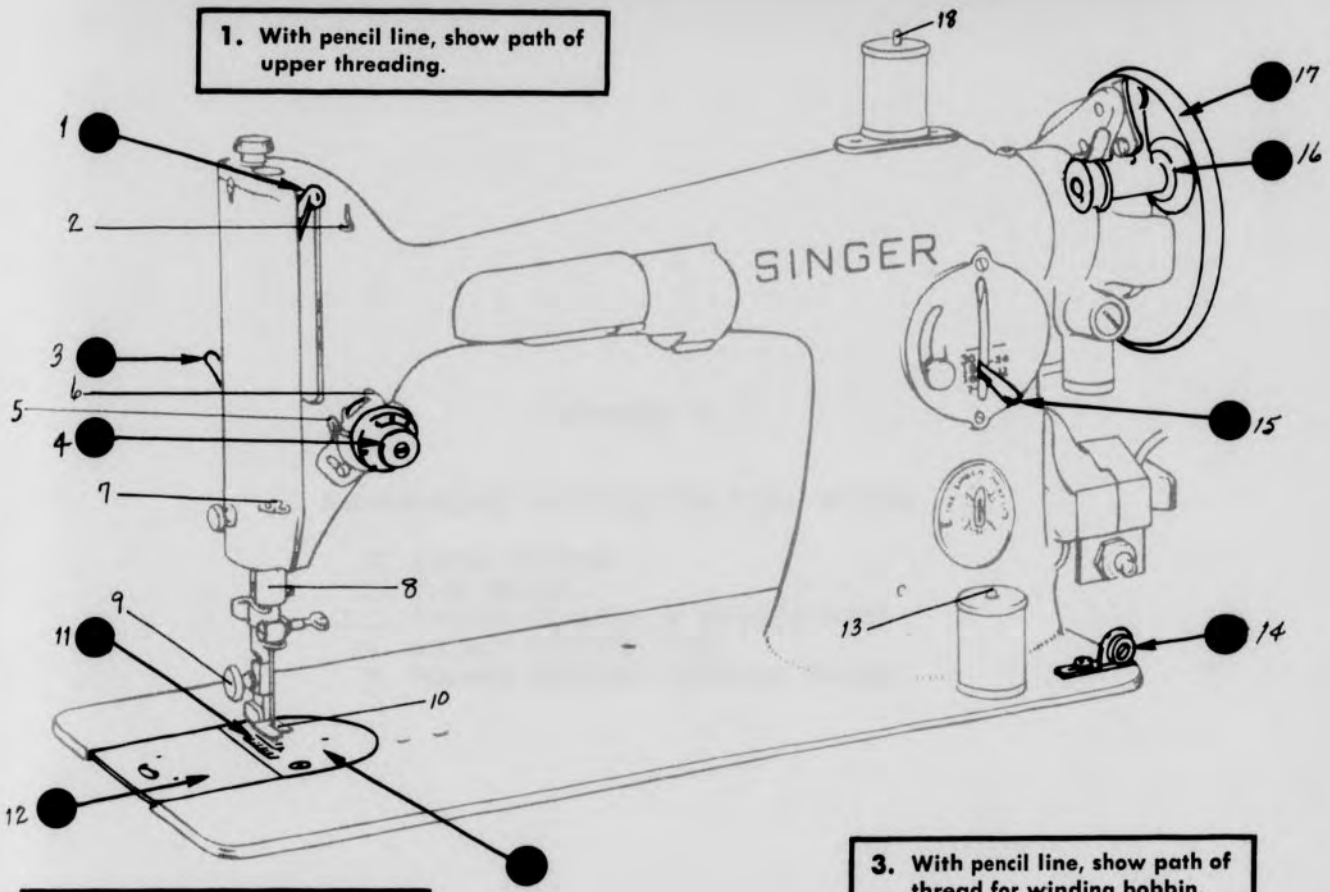
While stitching, keep the edges of the fabric on the 1/2-inch guide line. Stitch six inches and remove the fabric from the machine.

✓

SINGER

TEST CHART
No. 201 Machine

1. With pencil line, show path of upper threading.



2. Name the numbered parts.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

3. With pencil line, show path of thread for winding bobbin.

E.D. 112 (162)

APPENDIX D

SUPPLEMENTARY MATERIALS FOR FIELD TESTING

I. ANSWER BOOKLET
II. TIME RECORD
III. STUDENT INFORMATION QUESTIONNAIRE
IV. STUDENT ATTITUDE FORM
V. TEACHER REACTION INTERVIEW RECORD

THE SEWING MACHINE PROGRAM

Answer Booklet

Name ______________________

*311. no response
*312. _____
Blue *313. _____
Green *314. _____
Pink _____
*315. _____
*316. _____
*317. _____

*318. no response
*319. _____
*320. _____
321. _____
_____
_____
322. _____
323. _____
324. _____
325. _____
326. _____
327. _____
328. _____
329. no response
330. _____
331. no response
Yellow *332. _____
Gray

Blue *332. no response
Pink
Green

*333. _____
*334. _____
Gray *334a. _____
Yellow

335. _____
336. _____
337. _____
338. no response
339. no response
340. CONGRATULATIONS!

THE SEWING MACHINE PROGRAM

ANSWER BOOKLET

INTRODUCTION - What is a Program?
DIRECTIONS TO THE STUDENT

1. no response
2. _____
_____
3. _____
4. no response
5. no response
6. no response

THE SEWING MACHINE PROGRAM

1. _____
2. no response
3. _____
_____
4. _____
5. _____
_____
6. _____
7. _____
_____
8. _____
9. no response
10. _____
11. no response
12. no response
13. _____
14. _____
15. _____
16. _____
17. _____
18. _____
19. _____
_____
20. _____
_____

21. _____
22. _____
23. _____
24. no response
● *25. _____
26. _____
27. _____
28. _____
29. _____
30. no response
31. _____
32. _____
33. _____
34. _____
35. _____
36. _____
37. _____
38. _____
39. no response
40. _____
41. _____
42. no response
*43. _____
*44. _____
● *45. _____
*46. _____
● 47. _____
48. _____
49. _____
50. _____
*51. _____

281. no response
282. no response
283. _____
284. _____
285. _____
● 286. _____
287. _____
288. no response
289. no response
290. no response
291. no response
292. no response
293. _____
294. _____
295. _____
296. no response
297. _____
298. _____
299. _____
300. _____
301. _____
302. _____
● 303. _____
304. _____
305. no response
● 306. _____
307. no response
308. _____
309. no response
310. no response
*311. _____
*312. _____
● *313. _____
Gray *314. _____
Yellow *315. _____
*316. _____
*317. _____
*317a. _____

PAGE 10

246. no response
247.
248.
249.
250.
251.
252.
253. no response
254.
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256.
257.
258.
259.
260. no response
261. no response
262.
*263.
264.
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267. no response
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269. no response
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271. no response
272. no response
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279. no response

PAGE 3

52.
*53.
54.
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56.
57.
*58. A.
B.
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85. 1.
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90. no response
91.
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PAGE 9

206.
207.
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209.
210. no response
211.
212.
213.
214.
215.
*216.
217.
218.
219. no response
220.
221.
222.
223.
224.
225.
226.
227. no response
228. no response
229.
230.
231.
232.
233.
234. no response
235. no response
236.
237.
238.
239.
240. 1.
2.
241.
242. no response
243.
244.

176. no response
177. no response
178. no response
179. no response
180. no response
*181. _____
*182. _____
183. _____
*184. _____
185. _____
186. no response
187. _____
188. _____
189. _____
190. _____
191. no response
192. _____
193. no response
194. _____
195. _____
196. _____
197. _____
198. _____
199. _____
200. _____
201. A._____
B._____
C._____
202. _____
203. no response
204. _____
205. _____

104. _____
105. _____
106. 1._____
2._____
3._____
107. _____
108. _____
109. _____
110. no response
111. _____
112. _____
113. _____
114. _____
115. _____
116. no response
117. _____
118. _____
119. no response
120. _____
121. _____
122. no response
123. no response
124. _____
125. _____
126. _____
127. no response
*128. _____
*129. _____
*130. _____
*131. _____

PAGE 6

132. _____
133. no response
*134. no response
Green, Blue, Pink: *135. _____
Yellow, Pink: *135a. _____
*135. no response
136. no response
137. _____
138. _____
139. _____
140. _____
141. _____
142. _____
143. _____
144. _____
145. _____
146. _____
147. _____
*148. _____
*149. no response
*150. _____
*151. _____
152. no response
*153. _____
*154. _____
155. _____

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156. _____
157. _____
*158. _____
159. _____
160. _____
161. no response
*162. _____
*163. _____
*164. _____
Yellow, Pink: *165. _____
Green, Blue, Gray: *165. _____
*166. _____
*167. _____
Green, Blue, Gray: *168. _____
*168. _____
Yellow, Pink: *168a. _____
*168b. _____
*168c. _____
169. _____
170. _____
171. _____
172. _____
173. _____
174. _____
175. _____

Date

THE

THE SEWING MACHINE PROGRAM TIME RECORD NAME _____

Date	Beginning Frame No.	Last Frame No.	Total Frames	Number of Errors	Beginning Time	Ending Time	Total Time

172. _____
173. _____
174. _____
175. _____

*151. _____
152. no response
*153. _____
*154. _____
155. _____

STUDENT INFORMATION QUESTIONNAIRE

NAME _____

DATE _____

SCHOOL _____

AGE _____

GRADE IN SCHOOL _____

Make a check (✓) in the appropriate blank under the answer you choose.

	YES	NO
1. Have you ever used a sewing machine?		
2. Do you have a sewing machine in your home?		
3. Do you really want to learn to use the sewing machine or, if you have used the machine, do you want to know more about it?		
4. Does your mother want you to learn to use a sewing machine?		

-2-

	YES	NO
5. Has your mother or anyone else at home taught you anything about the sewing machine?		
6. Did you use the sewing machine in a Junior High School home economics class or in 4-H Club work?		
7. Can you thread a sewing machine by yourself?		
8. Do you know the names of the different parts of the sewing machine and how to adjust them?		
9. Do you like to try new ways of learning?		
10. Would you rather listen to a demonstration than work by yourself on something new?		

NAME _____

DATE _____

SCHOOL _____

AGE _____

GRADE IN SCHOOL _____

STUDENT REACTION TO PROGRAMED TEACHING

INSTRUCTIONS: The method by which you learned how to use the sewing machine is programed teaching. Now that you have finished the program, how do you feel about this kind of learning? The following statements are being used to determine your opinion of this new method of teaching. There are no right or wrong answers, think only of your personal opinion of each statement. Your answers will in no way affect your grade in this course.

NOTE:
1. Please read each statement carefully.
2. Place a check (✓) in the space to the left of each statement which best explains how you feel about that statement. If you agree very much with statement 1, place a check in the space under agree very much beside statement 1.

AGREE VERY MUCH	AGREE	UNCERTAIN	DISAGREE	DISAGREE VERY MUCH	
					1. Programed teaching is a good way to learn because students can move as rapidly or as slowly as they wish.
					2. Programed teaching is good because some students are not left behind other students in the class.
					3. Programed teaching is a better way to learn than other methods of teaching.
					4. Programed teaching is more interesting than other methods of teaching.
					5. Programed teaching is interesting because it is new.
					6. Programed teaching is a boring way to learn.
					7. Teachers can teach better than a program can teach.
					8. Programed teaching is boring because the facts are repeated too many times.

AGREE VERY MUCH	AGREE	UNCERTAIN	DISAGREE	DISAGREE VERY MUCH	
					9. Programed teaching is better than other methods of teaching because the important things are learned step by step.
					10. Programed teaching is good because the student is shown immediately if an answer is right or wrong.
					11. Programed teaching is good because the steps are placed in logical order.
					12. Programed teaching is effective because the student learns a small amount at a time.
					13. Programed teaching is good because you learn while you are doing something--it is not just reading or listening.
					14. Programed teaching would be better used as homework than in the classroom.
					15. I believe I could have learned more about the sewing machine from teacher demonstrations.
					16. I would like to have <u>all</u> my high school courses programed.
					17. I would like to have <u>part</u> of my courses programed.
					18. I would like to have <u>some</u> programed materials used in a few of my courses.
					19. I would like to learn another skill (how to do something) by this new method.
					20. The more I worked with programed materials, the better I liked them.
					21. I liked having the teacher tell me whether some step had been completed correctly or incorrectly--it gave me a feeling of accomplishment.
					22. I liked working by myself without interruptions.

SCHOOL _____

TEACHER REACTION INTERVIEW RECORD TEACHER _____

DATE _____

1. How did the students who completed the program compare with students in previous home economics clothing classes who had not learned to use the sewing machine by proceeding through a program with respect to the following:

-ability of students to work individually

-number of machine adjustment problems; number of requests for help on the machine

-availability of your time to work with construction problems

-amount of time spent in learning to use the machine

-skill at the end of the clothing unit in using the machine

(Schools A & C)

2. What value do you see in having some previously trained student reinforce frames?

What problems?

(Schools B and C)

3. Suppose you were to use the program without the help of a researcher. What have you learned that would help you?

(Schools A, B, C & D)

Would you plan to administer the program in the same manner?

What changes would you make in the procedure?

4. Did you clearly understand the Instructions to the Teacher?

Was enough information included?

What changes would you make?

5. For what purpose (s) would programed instruction be best used in the home economics classroom?

_____remedial work
_____regular instruction
_____beginning of a unit
_____the whole unit
_____enrichment
_____at various times, all of the above
_____none of the above

_____home work
_____classwork

6. Would you choose to use the Sewing Machine Program with classes next year, if it is available? Why?

7. Would you use it if you had to buy it?

8. Would you like to have more home economics programs available?

   Why?

9. In which areas would you like these programs?

10. What suggestions do you have for improving the Sewing Machine Program?

APPENDIX E

LETTERS TO TEACHERS AND PRINCIPALS

THE UNIVERSITY OF NORTH CAROLINA
AT
GREENSBORO

SCHOOL OF HOME ECONOMICS GREENSBORO, N. C. 27412

November 6, 1963

Dear _____:

Early in September at the first meeting of the Guilford-Randolph teachers of home economics, we told you about our intended work with the Sewing Machine Program. We are pleased to tell you that our intentions have now reached reality! Within a week or two the program will be assembled and ready for use in high school classes.

In order for us to schedule field testing and manage to visit each one interested in the program, we will need some further information about your school program. Please check the enclosed sheet and return it as soon as possible.

As our plans are completed you will be notified when we plan to visit your school.

We are looking forward to working with you and your students in this project.

Yours truly,

Hildegarde Johnson
Chairman,
Home Economics Education

Sarah M. Shoffner
Graduate Research Assistant

HJ and SMS/SS
enclosure

NAME OF TEACHER _____

NAME OF SCHOOL _____

NAME OF PRINCIPAL _____

ADDRESS OF SCHOOL _____

_____

DATE CLOTHING UNIT IS TO BEGIN _____
(Or earliest date you could use the Sewing Machine Program)

NUMBER OF CLASSES IN HOME ECONOMICS I _____
(in which you wish to use the Sewing Machine Program)

CLASS (information for each class using program)	NUMBER OF STUDENTS	TIME CLASS MEETS
1. Home Economics I		
2. Home Economics I		
3.		

LIST NUMBER AND MODELS OF SINGER SEWING MACHINES IN THE DEPARTMENT

THE UNIVERSITY OF NORTH CAROLINA
AT
GREENSBORO

SCHOOL OF HOME ECONOMICS

GREENSBORO, N. C. 27412

December 4, 1963

Dear Mr. _____:

I am a graduate research assistant at the University of North Carolina at Greensboro in the area of Home Economics Education. For about two years the staff has been working in the area of programed instruction and has developed a self-instructional program on the sewing machine for first-year home economics students. The revised edition is now ready to be field tested in several high schools. As these programs are tested, I will gather data for my Master's thesis under the direction of Dr. Hildegarde Johnson, chairman of Home Economics Education here at the University.

_____, the home economics teacher in your school, has indicated an interest in using the programed materials beginning around January 7, 1964. She has sent us information regarding the number of students in her classes and the class schedules.

During the time the program and evaluation materials are being administered, I would like to be present in the classroom. As our plans are further completed, you may discuss these plans with _____.

I would like your permission to do this testing in your school.

Sincerely yours,

Sarah M. Shoffner
Graduate Research Assistant
Home Economics Education

APPENDIX F

INSTRUCTIONS TO THE TEACHERS

REVISED INSTRUCTIONS TO THE TEACHERS

INSTRUCTIONS TO THE TEACHER

1. You will need to go through the program at a sewing machine, making all the responses that a student will make.

2. This program is designed for Singer sewing machines.
Certain frames are applicable only to certain models of the sewing machine.
The colors of frames to be used in each model are:

66 - gray
15-91 - yellow
201 - blue
301 - pink
404 - green

3. Count the machines of each model which you have in the home economics department and prepare a program for each machine. The colored frames are numbered. Insert them in the program so that the frames run consecutively.

4. Place at each machine the following:
   - a program with insertions corresponding to the machine model
   - two spools of thread, one color for the bobbin and another for the spool pin (Be sure the spools are at least half full.)
   - scissors
   - 14 six-inch squares of cloth
   - ruled paper
   - zipper foot
   - 3-inch strip of masking tape (3/4" wide)
   - ruler
   - a 3 x 5 card
   - straight pins (at least two)

5. Before the students begin to work on the program, open the machines and insert the correct bobbin in each machine.

6. Have only one student work at each machine. (It may be necessary to plan work for class members who must wait to use the sewing machine program.)

7. Be sure the student uses a machine of the same model throughout her work with the program.

8. Teach students who are to use treadle machines to treadle smoothly before they begin the program.

9. Students have been directed to call the teacher to watch them perform the frames indicated with a black dot (●). After they have completed the frame, indicate whether they performed the task correctly or incorrectly by nodding your head or by saying "yes" or "no." When the student performs correctly the first time, make a check (✓) with a red pencil on the answer page. If the task is incorrectly performed, make an "X."

10. You may wish to select two or three students to assist you by going to the students who raise their hands for observation of performance on frames indicated with a black dot (●).

REVISED INSTRUCTIONS TO THE TEACHER

GENERAL INFORMATION

This program is designed for Singer sewing machines. Certain frames are applicable only to certain models of the sewing machine. The frames are printed on colored paper, one color being used for each sewing machine model. The colors of frames to be used in each program are:

66 - gray
15-91 - yellow
201 - blue
301 - pink
404 - green

Have only one student work at each machine. Be sure the student uses a machine of the same model throughout her work with the program.

You may wish to select two or three students to assist you by going to the students who raise their hands for observation of performance on frames indicated with a black dot. Administer the program to these students prior to the scheduled time for the other class members to use it.

Plan desk work for class members who are waiting to use the program or teach the group while student assistants work with the program group.

Use the sections below as a guide. Check the items when you have completed the preparation.

THINGS TO DO

____ (1) Review the Program
You will need to go through this program at a sewing machine, making all the responses that a student will make.

____ (2) Administer Program to Student Assistants
Acquaint them with all models of machines in the department. Give the assistants diagrams which will remind them the direction in which the thread moves in each model.

____ (3) Prepare the Programs
Count the machines of each model which you have in the home economics department and prepare a program for each machine. Frames are numbered. Insert the colored frames in the program so that the frame numbers are in sequence.

____ (4) Prepare the Sewing Machines and Equipment
Open the machines and insert the correct bobbin in each machine.

Equipment List
Place the following items at each machine:

____ a program with insertions corresponding to the machine model

____ two spools of thread, one color for the bobbin and another for the spool pin (Be sure the spools are at least half full.)

____ scissors

____ zipper foot

____ ruler

____ straight pins (at least two)

Multiply these items by the number of students in the class. Place these on the machines or on a central supply table.

____ 14 six-inch squares of cloth	____ 3-inch strip of masking tape (3/4" wide)
____ ruled paper	____ 3 x 5" card

____ (5) Teach Students to Treadle Machines

Teach students who are to use treadle machines to treadle smoothly before they begin the programs.

____ (6) Reinforce Frames

Students have been directed to call the teacher to watch them perform the frames indicated by a black dot (●). After they have completed the frame, indicate whether they performed the task correctly or incorrectly by nodding your head or by saying "yes" or "no." When the student performs correctly the first time, have her make a check (✓) on the answer page. If the task is incorrectly performed, make an "x."

APPENDIX G

INSTRUCTIONS TO THE STUDENTS

INSTRUCTIONS TO THE STUDENTS, TO BE GIVEN ORALLY

NOTE: Before reading these instructions to the student write the following on the chalkboard:

(1)

Date	Beginning Frame No.	Last Frame No.	Total Frames	Number of Errors	Beginning Time	Ending Time	Total Time
Jan. 8	42	122	80	4	2:35	3:25	50 min.

(2)
-date,
-frame number with which you begin and
-time you begin working

(3)
-last frame number completed,
-total number of frames completed that day,
-time you stopped working,
-number of minutes spent on the program that day and
-number of errors made that day.

1. You are cooperating in a research study on a new way to learn. Some of you may have heard about this new method which is known by several names: programed instruction, programed learning, self-instruction and learning by teaching machines. You are going to learn to use the sewing machine by teaching yourself.

SHOW PROGRAM

2. You will use a programed text about the sewing machine. There are two parts. When you have completed Part I, you will be given Part II. The directions in the beginning of the program tell you how to proceed through each part. Be sure to read the directions carefully.

PASS OUT ANSWER BOOKLETS

3. Write your name on all the materials you are given, except on the programed text. Please write your last name first.

4. We want to find out what students in first year home economics know about the sewing machine before they begin a sewing unit and some of the things they like to do. Fill in the Student Information Questionnaire which is in the answer booklet. (Give the students time to fill in the questionnaire. Collect the questionnaires and file them in the school folder).

5. On most of the pages in the programed booklet you are asked to answer a question or complete some statement. This is not, however, a test. If you make many mistakes, it is our fault, and we will continue to improve the program in those sections where you have difficulty. The program teaches the correct answer. In the answer booklet each page of the program has a space in which you will write your answer. If you make an error, place a small "x" to the left of the number on the answer booklet.

6. A time record was included in the materials given out earlier. You will fill it out each day to let us know how much time you spend on the program, the number of errors you make, and the number of frames or pages you finish each day. Now look at the time record. When you begin work each day, fill in the

   -date,
   -frame number with which you begin and
   -time you begin working.

REFER TO CHALKBOARD

When you finish working, 5 minutes before the end of the class each day, fill in the

-last frame number completed,
-total number of frames completed that day,
-time you stopped working,
-number of minutes spent on the program that day and
-number of errors made that day.

For example, if you begin at frame 42 on Jan. 8 write 42 in the appropriate blank. (Refer to the chalkboard. Continue to explain entries in the sample time record on the chalkboard.)

7. Each day you will come in and begin work <u>without waiting</u> for the whole class to start. Go to the machine to which you have been assigned, write down the beginning frame number, and the time you begin. Then start to work.

8. Remember, since some people cannot work when others are talking, work as quietly as possible.

9. Raise your hand if you have a question.

SPECIAL INSTRUCTIONS IN SCHOOLS B, C, AND D.

One-half of the class will begin working on the program while the other half works with your teacher. As you finish the program, a girl in the other group will take your place.

SPECIAL INSTRUCTIONS IN SCHOOL A

After you have completed the program, you will work with your teacher until the rest of the class finishes. (Girls will have been assigned to the machine ahead of time. Those using the treadle machines will know how to treadle.)

APPENDIX H

CRITERION PERFORMANCE TEST

PROCEDURE FOR TEACHERS

TEACHER'S CHECK SHEET

STUDENT INSTRUCTIONS

Read the directions carefully. Your score will be influenced by how you follow the directions. Do each step as accurately and as rapidly as possible. If you have to wait for the teacher, study the next steps. At each "STOP" sign, raise your hand to call the teacher. She will score what you have done thus far.

PART I BOBBIN

1. Open the sewing machine (if not already open).

2. Fill an empty bobbin about 1/3 full. Do not cut the threads. Do not remove the bobbin from the bobbin winder.

STOP -- Raise your hand.

PART II THREADING THE MACHINE

1. Thread the machine, both upper and lower parts. Use two colors of thread.

2. Bring the bobbin thread up through the hole in the needle plate.

3. Do anything that is necessary so that the machine is ready for you to put the fabric in place and stitch.

STOP -- Raise your hand.

PART III TENSION, STITCH-LENGTH REGULATOR, AND STITCHING

1. Set the stitch-length regulator to sew 10 stitches per inch.

2. On the fabric provided, check the machine to see if the tension is correct. Continue to adjust the tension regulator and to check the machine until the tension is correct.

STOP -- Raise your hand. The teacher will ask you to make a row of stitching 5/8 inch from the edge on another piece of fabric so she can check the way you stitch and the way you test for tension.

PART IV ZIPPER FOOT

1. Remove the presser foot.

2. Attach the zipper foot.

STOP -- Raise your hand.

1. Replace the presser foot and turn in all materials.

2. Close the machine unless it should be left open.

PROCEDURE FOR TEACHERS

Materials Needed

1. Two pieces of fabric 6" square for each student. You will probably need some extra squares.
2. Two colors of thread for each student.
3. Scissors for each student.
4. Empty bobbin for each machine.
5. Zipper foot for each machine.
6. Cards indicating how to thread upper and lower parts of each model of machine with which teacher is not familiar.

Instructions:

1. Each machine should be in perfect adjustment except that the upper tension is loose and the stitches are as long as they can be made on each machine.
2. The stop-motion screws should be working. If one does not, do not count it as a student error.
3. Students should use the machine with which they are familiar.
4. Explain general procedure to students. They are to work as rapidly, accurately, and as independently as possible. They will be checked at the conclusion of each part of the test. The thread on the bobbin will be a different color from that used on the spool. Their mistakes will be corrected after being checked in order that they may proceed with the test.

School_____ Name_____

Date_____

TEACHER'S CHECK SHEET

Check each student's work at each STOP sign. Place an (x) in the blank preceding each statement if the student performs incorrectly. (Note: The statements indicate the correct performance.) Write in other difficulties.

Incorrect Performance (x)

PART I BOBBIN

_____1. The spool of thread is on the bobbin spool pin.
_____2. The thread guide between the bobbin spool pin and the bobbin winder is used.
_____3. The bobbin is pushed far enough on the spindle.
_____4. The stop-motion screw is loose.

PART II THREADING THE MACHINE

_____1. The spool of thread is placed on the spool pin so that it rotates in a counter clockwise direction.
_____2. The first thread guide is threaded.
_____3. The tension regulator is threaded.
_____4. The thread is between the discs of the tension regulator.
_____5. The thread pushes against the wire spring.
_____6. The thread guide (s) on or near the tension regulator is (are) threaded.
_____7. The thread is put through the thread take-up after the tension regulator.
_____8. The thread is put through the hole in the thread take-up.
_____9. The thread is put through all the thread guides in the area of the needle.
_____10. The thread take-up is at its highest point.
_____11. The needle is at its highest point.
_____12. The needle is threaded from the same side on which the last thread guide is located.
_____13. The bobbin thread is brought to the surface through the needle hole.
_____14. Both threads are pulled under the presser foot and to the back.
_____15. The slide plate is closed.
_____16. The bobbin thread is placed in the bobbin case so that the bobbin turns in the correct direction for this machine.
_____17. The thread is placed in the slot and under the spring on the bobbin case. The thread lies across the bobbin.
_____18. The stop-motion screw is tightened.

Incorrect Performance (x)

PART III TENSION, STITCH-LENGTH REGULATOR, AND STITCHING

Note: After the student has adjusted the machine, ask her to make another row of stitching as before. Watch her procedure in stitching. Ask her to explain to you what she is doing as she repeats the test for tension adjustment.

_____ 1. A diagonal fold is used.
_____ 2. The bulk of the fabric is to the left of the needle.
_____ 3. The thread take-up is at its highest point.
_____ 4. The needle is at its highest point.
_____ 5. The needle is placed in the fabric before the presser foot is lowered.
_____ 6. The hand wheel is used to begin the first few stitches.
_____ 7. The line of stitching is 5/8 inch from the edge.
_____ 8. The hand wheel is used to make the last few stitches.
_____ 9. The student stopped before stitching off the edge of the fabric.
_____ 10. The thread take-up and the needle are left at their highest points.
_____ 11. The fabric is removed by pulling it toward the back so the threads are still under the presser foot.
_____ 12. The threads are cut so that three inches are left beyond the needle.
_____ 13. The stitch-length regulator is set for 10 stitches per inch.
_____ 14. The screw on the stitch-length regulator is tightened.
_____ 15. The line of stitching is pulled to see if the threads break.
_____ 16. The student knows that both upper and lower threads must break for both tensions to be correct.
_____ 17.a. The student knows that a broken upper stitch means a tight upper tension.
_____ b. The student knows that an unbroken upper stitch means a loose upper tension.
_____ 18.a. The student knows that the upper tension needs to be loosened when the upper stitch is broken.
_____ b. The student knows that the upper tension needs to be tightened when the upper stitch is unbroken.

PART IV ZIPPER PRESSER FOOT

_____ 1. The zipper foot is attached to the presser bar at the proper place of the zipper foot.
_____ 2. The screw is so tight that there is no danger of its becoming loose during stitching.

APPENDIX I

EVALUATION OF INDIVIDUAL FRAMES

Evaluation of Individual Frames

The responses were studied to determine which frames needed improving or needed additional lead-up frames in order to lower the error rate. The following are the 32 frames to which there was an error rate of 10 percent or over:

Frame Number	
6	195
20	240, number 2, lines 1 and 2
44	245
45	249
49	255
60	256
69	257
70, number 4, 5, and 6	268
81	276
96, number 1	278
105	287
140	299, line 3
146	322
158, line 3	325
171	335
182	336

APPENDIX J

STUDENT REACTION TO PROGRAMED TEACHING

STUDENT REACTION TO PROGRAMED TEACHING

Item No.	Statements of Attitude	Group*	Agree very much	Agree	Un-certain	Dis-agree	Disagree very much	No response
1.	Programed teaching is a good way to learn because students can move as rapidly or as slowly as they wish.	1	87.5	12.5	0	0	0	0
		2	78.8	21.2	0	0	0	0
		3	66.7	33.3	0	0	0	0
			77.4	22.6	0	0	0	0
13.	Programed teaching is good because you learn while you are doing something--it is not just reading or listening.	1	83.3	16.7	0	0	0	0
		2	71.2	26.9	1.9	0	0	0
		3	76.7	16.7	0	0	3.3	3.3
			75.5	21.7	.9	0	.9	.9
9.	Programed teaching is better than other methods of teaching because the important things are learned step by step.	1	50.0	50.0	0	0	0	0
		2	55.8	38.5	1.9	3.8	0	0
		3	70.0	26.7	0	0	0	3.3
			58.5	37.7	.9	1.9	0	.9
22.	I liked working by myself without interruptions.	1	66.7	29.2	0	4.2	0	0
		2	53.8	38.5	5.8	1.9	0	0
		3	50.0	36.7	3.3	0	6.7	3.3
			55.7	35.8	3.8	1.9	1.9	.9
6.	Programed teaching is a boring way to learn.	1	0	0	0	41.7	54.2	4.2
		2	0	0	0	50.0	48.1	1.9
		3	0	6.7	3.3	23.3	66.7	0
			0	1.9	.9	40.6	54.7	1.9
10.	Programed teaching is good because the student is shown immediately if an answer is right or wrong.	1	50.0	41.7	8.3	0	0	0
		2	44.2	51.9	3.8	0	0	0
		3	50.0	46.7	0	0	0	3.3
			47.2	48.1	3.8	0	0	.9

*Group 1 grade point average 93 - 100
Group 2 grade point average 80 - 92
Group 3 grade point average 79 and below

STUDENT REACTION TO PROGRAMED TEACHING (continued)

Item No.	Statements of Attitude	Groups	Agree very much	Agree	Uncertain	Disagree	Disagree very much	No response
4.	Programed teaching is more interesting than other methods of teaching.	1	58.3	33.3	4.2	0	0	4.2
		2	36.5	48.1	11.5	3.8	0	0
		3	56.7	36.7	6.6	0	0	0
			47.2	41.5	8.5	1.9	0	.9
12.	Programed teaching is effective because the student learns a small amount at a time.	1	41.7	54.2	4.2	0	0	0
		2	40.4	50.0	3.8	3.8	1.9	0
		3	43.3	26.7	16.7	6.7	3.3	3.3
			41.5	44.3	7.5	3.8	1.9	.9
11.	Programed teaching is good because the steps are placed in logical order.	1	37.5	62.5	0	0	0	0
		2	38.5	59.6	1.9	0	0	0
		3	43.3	46.7	6.7	0	0	3.3
			39.6	56.6	2.8	0	0	.9
5.	Programed teaching is interesting because it is new.	1	50.0	41.7	8.3	0	0	0
		2	38.5	48.1	3.8	3.8	5.8	0
		3	33.3	63.3	3.3	0	0	0
			39.6	50.9	4.7	1.9	2.8	0
3.	Programed teaching is a better way to learn than other methods of teaching.	1	37.5	45.8	12.5	4.2	0	0
		2	32.7	44.2	17.3	3.8	1.9	0
		3	53.3	30.0	16.7	0	0	0
			39.6	40.6	16.0	2.8	.9	0
2.	Programed teaching is good because some students are not left behind other students in the class.	1	45.8	41.7	4.2	8.3	0	0
		2	38.5	38.5	7.7	7.7	1.9	0
		3	30.0	56.7	6.7	6.7	0	0
			37.7	44.3	9.4	7.5	.9	0

STUDENT REACTION TO PROGRAMED TEACHING (continued)

Item No.	Statements of Attitude	Groups	Agree very much	Agree	Uncertain	Disagree	Disagree very much	No response
21.	I liked having the teacher tell me whether some step had been completed correctly or incorrectly--it gave me a feeling of accomplishment.	1	16.7	79.2	4.2	0	0	0
		2	34.6	48.1	7.7	7.7	0	1.9
		3	46.7	43.3	3.3	3.3	0	3.3
			34.0	53.8	5.7	4.7	0	1.9
20.	The more I worked with programed materials, the better I liked them.	1	29.2	58.3	12.5	0	0	0
		2	34.6	50.0	13.5	1.9	0	0
		3	36.7	50.0	10.0	0	0	3.3
			34.0	51.9	12.3	.9	0	.9
15.	I believe I could have learned more about the sewing machine from teacher demonstrations.	1	0	0	0	45.8	54.2	0
		2	1.9	1.9	15.4	57.7	23.1	0
		3	6.7	6.7	6.7	40.0	36.7	3.3
			2.8	2.8	9.4	50.0	34.0	.9
19.	I would like to learn another skill (how to do something) by this new method.	1	25.0	70.8	4.2	0	0	0
		2	32.7	61.5	5.8	0	0	0
		3	40.0	50.0	6.7	0	0	3.3
			33.0	60.4	5.7	0	0	.9
8.	Programed teaching is boring because the facts are repeated too many times.	1	0	0	12.5	66.7	20.8	0
		2	1.9	1.9	11.5	44.2	38.5	1.9
		3	0	13.3	10.0	43.3	33.3	0
			.9	4.7	11.3	49.1	33.0	.9
7.	Teachers can teach better than a program can teach.	1	0	4.2	33.3	54.2	8.3	0
		2	0	5.8	44.2	44.2	5.8	0
		3	0	13.3	23.3	43.3	20.0	0
			0	7.5	35.8	46.2	10.4	0

STUDENT REACTION TO PROGRAMED TEACHING (continued)

Item No.	Statements of Attitude	Groups	Agree very much	Agree	Uncertain	Disagree	Disagree very much	No response
18.	I would like to have some programed materials used in a few of my courses.	1	20.8	58.3	16.7	4.2	0	0
		2	23.1	65.4	3.8	5.8	1.9	0
		3	13.3	63.3	16.7	3.3	0	3.3
			19.8	63.2	10.4	4.7	.9	.9
17.	I would like to have part of my courses programed.	1	8.3	62.5	20.8	8.3	0	0
		2	17.3	50.0	19.2	11.5	1.9	0
		3	10.0	50.0	23.3	6.7	3.3	6.7
			13.2	52.8	20.7	9.4	1.9	1.9
16.	I would like to have all my high school courses programed.	1	0	4.2	45.8	41.7	8.3	0
		2	9.6	7.7	40.4	32.7	9.6	0
		3	26.7	20.0	30.0	13.3	6.7	3.3
			12.3	10.4	38.7	29.2	8.5	.9
14.	Programed teaching would be better used as homework than in the classroom.	1	0	4.2	8.3	50.0	37.5	0
		2	1.9	0	32.7	44.2	21.2	0
		3	10.0	3.3	10.0	40.0	30.0	6.7
			3.8	1.9	20.8	44.3	27.4	1.9