A COMPETENCY-BASED MODULE FOR SEWING MACHINE OPERATION

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CHAPTER I

INTRODUCTION

Learning is a very complex process in which many variables interact. "This effective interaction is related to the concept of competence" (Burns and Klingstedt, 1973, p. 15). "The students in any particular classroom can be expected to vary widely in their mental ability, past achievement, learning rate, motivation, interests and learning style" (Gronlund, 1974, p. 1).

Ability grouping has been used as a partial solution to the wide range of individual differences but cannot meet the varied needs of the students. A competency-based approach in teaching is needed to provide individualized learning experiences.

Motivation is a key factor in learning and developing skills. Young and Van Mondfrans (1972) state that

> Conventional education recognizes the importance of motivation, and teachers employ such techniques as rewards, recognitions and grades for excellence to stimulate it. . . . Competency-based systems have the same need for motivated students (p. 23).

The emphasis on accountability demands that the student not only be knowledgeable but must also employ that knowledge successfully. Houston (1974) states that

> Two forces in the American society today have contributed to the development of competency-based education. The first is the emphasis on <u>accountability</u>. . . . The second force shaping educational direction is the need for personalization (p. 6).

The need for personalization reflects current societal changes of a transient society so comprehensive that Alvin Toffler (1970) described them as "the roaring current of change, a current so powerful today that it overturns institutions, shifts our values, and shrivels our roots" (p. 3).

Ours is a transient society. One family in four moves each year. Because of the nature and demands of a mobile society, transient students enter the classroom within the school year with varied degrees of classwork uniformity. This causes difficulty for the student and the teacher if the student is required to fit into a class mold.

Another societal problem which affects school is the high incident of pregnancy. In the United States 1.1 million pregnancies occurred among teenagers in 1978. "Between 1973 and 1978 there was a 13 percent increase in the number of teenage pregnancies . . . following the 1973 Supreme Court decisions" (Teenage Pregnancy, 1981, p. 20). Oklahoma rates among the nation's top 10 states in the number of teenage pregnancies. Teenage Pregnancy Rate High (1981) stated that 1600 girls under age 19 give birth in Tulsa County. In order to cope with this problem, the Tulsa Public School System established the Margaret Hudson Alternate School for pregnant teenagers. Students enroll at any time during pregnancy and six weeks after giving birth return to their home school. Therefore, there is a need to institute a program that allows for flexible coming and going in a home economics program.

Purpose and Objectives

The purpose of this study is to evaluate if competency-based

learning modules are viable teaching alternatives for teaching selected clothing construction skills to Homemaking I students. In order to accomplish the purpose as stated, the following specific objective guides the study.

1. To evaluate the input of competency-based modular instruction as an aid to student learning.

Assumptions and Limitations

The following assumptions are recognized for use in this research.

1. "A motivated learner acquires what he learns more readily than one who is not motivated" (Hilgard, 1956, p. 486).
2. "Active participation by a learner is preferable to passive reception when learning, for example, from a lecture or a motion picture" (Hilgard, 1956, p. 486).
3. "Meaningful materials and meaningful tasks are learned more readily than nonsense materials and more readily than tasks not understood by the learner" (Hilgard, 1956, p. 486).

The following limitations are recognized in this study.

1. The learning module is designed specifically for a selected school for pregnant teenagers.
2. The learning module is limited to one specific phase of clothing construction, the operation of a sewing machine.
3. The students have distractions to learning, concentration and motivation due to pregnancies.

Definitions

The following concepts are defined for clarity in this research.

1. Competency-Based Instruction:

> A process that combines competency statements, performance objectives, individualized instruction, criterion-referenced evaluation, and follow-up activities to produce a systematic approach to teaching and learning (Meszaros and Baird, 1979, p. 7).

2. Module: "A self-contained packet of materials for students to use to attain one or more objectives" (Meszaros and Baird, 1970, p. 84).

3. Clothing Construction: Stitching together of parts of fabric to form apparel (Random House Dictionary, 1968).

4. Individualized Instruction: "Adapting instructional procedures to fit each student's individual needs so as to maximize his learning and development" (Gronlund, 1974, pp. 1-2).

5. Motivation: "An inner will to act or accomplish something" (Young and Van Mondfrans, 1973, p. 23).

CHAPTER II

REVIEW OF LITERATURE

Within recent years there has been an enormous amount of literature written on the movement toward competency-based education. This review is concerned with a competency-based approach to learning and the use of learning modules to aid in teaching beginning clothing. It is intended to assist the reader in understanding principles related to competency-based education and in recognizing societal factors contributing to the need of a competency-based approach.

Competency-Based Education

From the two perceived needs of accountability and personalization have come the movement referred to as competency-based education. Houston (1974) identifies this term as being used interchangeably with performance-based education which employs the idea that one who possesses a knowledge must be able to apply that knowledge successfully in practice. The learner is required to do something rather than simply to know something. The learner demonstrates knowledge and skills through observable objectives such as to write, do, describe. Houston (1974, p. 7) states ". . . the emphasis on performance reminds us that knowledge alone is inadequate; knowledge must be employed in overt action."

In framing a philosophical basis for competency-based education

Klingstedt (1972) states that

> . . . competency-based education is based on the specification or definition of what constitutes competency in a given field. . . . The way in which the ageed-upon level of competency is communicated is through the use of specific, behavioral objectives for which criterion levels of performance have been established. Once the required behaviors have been specified, they are placed in a hierarchy leading from simple to complex, and then an instructional sequence is planned that will help the learner achieve the desired behaviors. When the learner is ready, a test or check of some sort is administered to determine if the required level of competency has been achieved (p. 7).

In competency-based education, time may vary but achievement is held constant. If the required criterion level of performance is 100 percent accuracy, the learner does not "pass" with 90 percent accuracy. The criterion level is the same for all groups. Klingstedt (1972) further states

> As the nature or complexity of a field changes, the criterion levels have to be adjusted to meet the new situations. . . . The emphasis in competency-based education is on achievement of specified objectives and not the ranking of learners (p. 8).

Therefore, a major concern is to provide many alternative ways for the learner to accomplish the stated objectives. The learner may choose from a list of selected readings, a lecture, a videotape presentation, a slide-tape package, a learning module, or other options.

The essential elements necessary in a competency-based education program are defined by Elam (1971)

1. Competencies (knowledge, skills, behaviors) to be demonstrated by the student are
   - derived from explicit conceptions of teacher roles;
   - stated so as to make possible assessment of a student's behavior in relationship to specific competencies; and
   - made public in advance.
2. Criteria to be employed in assessing competencies are
   - based upon, and in harmony with, specified competencies;
   - explicit in stating expected levels of mastery under specified conditions; and
   - made public in advance.

3. Assessment of the student's competency
   - uses his performance as the primary source of evidence;
   - takes into account evidence of the student's knowledge relevant to planning for, analyzing, interpreting, or evaluating situations or behavior; and
   - strives for objectivity.
4. The student's rate of progress through the program is determined by demonstrated competency rather than by time or course completion.
5. The instructional program is intended to facilitate the development and evaluation of the student's achievement of competencies specified (pp. 6-7).

Elam also lists another level of description as characteristics implied in the list of essential elements and are often found in competency-based programs. He states

1. Instruction is individualized and personalized.
2. The learning experience of the individual is guided by feedback.
3. The program as a whole is systemic.
4. The emphasis is on exit, not on entrance, requirements.
5. Instruction is modularized.
6. The student is held accountable for performance, completing the preparation program when, and only when, he demonstrates the competencies that have been identified as requisite for a particular professional role (pp. 7; 9).

Utz (1975) summarizes competency-based education as he states that

> A competency-based curriculum is not a method of teaching, it is a way of organizing the teaching process in a systematic way to include a needs assessment, specification of objectives, preassessment, learning alternatives, and postassessment. Since it is individualized, students may vary with regard to points of entry, learning methods, and rate of completion (p. 2).

Individualization

Individual instruction should not be thought of as one particular method. Gronlund (1974) describes individual instruction as a teaching strategy. He states

1. Individual instruction may range from minor modifications in group instruction to completely independent learning.

2. Individualized instruction may permit variation in any of the following: rate of learning, the objectives pursued, the methods and materials of study and the required level of achievement.
3. Individualized instruction may be used in all subjects, in some subjects, in parts of some subjects, or only with particular students (p. 2).

Johnson and Johnson (1975) present a brief description of different approaches to individual instruction and a comparison chart based on the inclusion of the following:

1. Clear objectives?
2. Frequent measures of student attitude?
3. Post-test present?
4. Practice questions for students?
5. Immediate feedback to students?
6. Objectives or test determines content selection?
7. Input varied as to source and length?
8. Media selection based on objectives?
9. Exportable stand-alone units?
10. Tryout data reported?
11. Analytical revision possible? (pp. 364-365).

Upon reviewing literature dealing with individualized instruction, it is apparent that there are numerous methods and approaches to classroom implementation. Kinghorn (1971) encompasses the thoughts when he states

> In the process of individualizing instruction there seems to be a logical learning cycle. Basically the learning cycle includes: 1. pre-assessment of the student, 2. determination of student learning objectives, 3. design of the learning program, 4. post-assessment (p. 204).

Motivation

For those of us who teach, the quest for motivated students is a goal worth pursuing. We know the benefits of enthusiasm and excitement of learning. The inner incentive that propels a student to seek knowledge is the force that challenges the unknown. Wlodkowski (1978) states

> With motivated students, communication flows, discipline problems lessen, anxiety decreases, and teaching can be the art that so many of us have been told that it is. With unmotivated students, communication is difficult at best, discipline problems increase, anxiety is heightened, and teaching becomes a badgering, nagging chore (p. 11).

In competency-based education, the possibilities for creativity engendered by the system motivate students. Students may select their own methods to develop performances and skills. According to Young and Van Mondfrans (1973, p. 23) "the environment is nonthreatening since the student is not concerned with whether he will pass or fail; he can take all the time he needs and make as many attempts as necessary to achieve the goal." However, Atkinson and Feather (1966) state that

> . . . motivation to avoid failure should always be conceived inhibitory to character. This avoidant tendency always opposes, resists, or dampens the influence of motivation to achieve success and extrinsic positive motivational tendencies to undertake some task (p. 19).

In designing guidelines for situation and case study techniques as a complement to brainstorming, Dunn and Dunn (1972) find that

> . . . participation in the development and actual writing or acting out of the roles in the case will stimulate the students to participate. Involving them in the types of cases and the goals will also increase the importance of the activity. The quality of the case presentation, its relevance and importance and the degree of involvement are all critical to the motivation of individuals or groups (p. 207).

Societal Factors

Permanence and stability are less characteristic of our life style than ever before. Houston (1974) states that

> With fewer demands on the workforce to produce foodstuffs, population patterns in the United States have shifted to increasing concentrations of people in the urban areas. . . . One family in four moves each year. . . . Products are made to be discarded . . . (p. 6).

Urban areas are concentrated with people who do not often have opportunities for interaction or interdependence. Job specialization often contributes to lack of personalization and transilience. Schools are affected by our transient society. During the school year 1980-1981, the mobility rates for Tulsa Public Schools were listed as "the average of all elementary schools at 44 percent, all junior high schools at 35 percent and all senior high schools at 33 percent" (Roger, 1981, pp. 1-2). The Margaret Hudson Alternate School for Teenage Parents recorded 60 students aged 13 through 19 enrolled at the beginning and ending of the 1980-1981 school year, with a total enrollment of 212 students for that period of time. Enrollment in Margaret Hudson Alternate School is accepted at any given time of pregnancy based on a doctor's permit. The student may stay through the delivery period extended to six weeks after delivery or her doctor's release.

Findings from the First Interhemispheric Conference on Adolescent Fertility, as stated in Findings and Recommendations (1979) indicate that

> Close to 13 million of the 60 million women who became mothers in 1975 became parents before they became adults. Early child-bearing is increasing everywhere . . . is emerging as a serious problem in many countries, and has reached alarming levels in others (p. 663).

Of 22 selected countries, including both industrialized and underdeveloped nations, the United States ranks fourth, with a rate of 58 births per 1000 females aged 15 through 19. In the United States, the state of Oklahoma ranks seventh in the number of adolescent pregnancies.

> In the 1970's, sexual activity among unmarried women aged 15-19 living in metropolitan areas rose by two-thirds. By the end of the decade, 46 percent of them reported that they had had intercourse. The increase was most dramatic

> among whites - especially those aged 15-17, whose rate of sexual activity doubled . . . although, age for age, the proportion of black teenagers who are sexually active continues to be higher than that of whites . . . unwed teenage mothers very rarely give up their babies for adoption . . . ninety-six percent of unmarried teenage mothers - 90 percent of white and virtually all of black mothers - keep their children with them (Teenage Pregnancy, 1981, p. 27).

With the high incident of teenage pregnancy throughout the nation, 1.1 million that occurred among teenagers in 1978, the consequences of teenage childbearing are many. Teenage Pregnancy (1981) reports that

> The most far-reaching consequence of teenage childbearing is the truncation of education among the young parents, and the resulting limitation of opportunities to gain skills needed to compete in society. Largely because of education deficits, teenage parents are frequently unable to get decent jobs, and their family incomes tend to be much lower than those earned by other families (p. 28).

The national magnitude of the problem involves 1.3 million children now living with 1.1 million teenage mothers.

In a study "How Early Background Affects Dating Behavior," Wolford (1948) finds that throughout the country, the need of young people of high school age for help with their personal and family relationships is critical. The findings are presented with respect to:

1. The students feeling of self-regard during childhood and also as young people.
2. The emotional tone of the home as revealed through the parent-child relationships and the parents' marital adjustment.
3. The relationships with contemporaries, especially with the other sex (p. 505).

The needs are summarized with their implications that they may be partly met by family life education.

In the last decade, the age for first-time sexual intercourse has plummeted to the pre- and early-teens resulting in children born to

mothers who are themselves children. The next generation chances that half of its population will consist of children who have been raised by children. Riker and Riker (1981) state that

> Our dominant concern is best illustrated with a high wire over which all adolescents must pass as they move from ages, eight, nine and ten headed for physical maturity. Below the tautly strung wire lurk the ever-present risks of pregnancy, VD, and abortion plus denied educational opportunities and careers never to be realized (p. 41).

Learning Modules

If individualizing the learning process is to be effective, there must be available a plan for learning. The terminology is expressed in various ways by several different plans. Shear and Ray (1969) state that

> Two fairly well-known plans are UNIPAC promoted by the Kettering Foundation through project I/D/E/A, and Learning Activities Packages called LAPs developed at the Nova Schools in Fort Lauderdale, Florida. Variations of these two package plans are being used in several places. Penn Manor High School in Millersville, Pennsylvania developed a plan called PAK (Penn Motor Activity Kit), while Speedier Project in Palmyra, Pennsylvania labeled their variation KEY (Knowledge, Education and You) (pp. 768-769).

Several learning packages have been formulated by home economics faculty and students at the Pennsylvania State University and the format for HELP (Home Economics Learning Packages) was developed. Learning packages, learning activity packages, learning packets, learning units or learning modules are some of the terms applied to materials designed to support the efforts of individualized instruction. Talbert (1968) states that

> A basic concept which underlies the use of the learning package is that students will learn better if they are (1) told what it is they are to be able to do as a result of the learning experience, (2) given a set of

> learning experiences which help them learn to do that which they are to be able to do, and (3) are then asked to demonstrate that they are able to do it (p. 21).

Components of Learning Modules

Various formats for learning modules have been formulated. Most modules have similar components but may vary because of subject area, population or the individual preference of the teacher. Kapfer (1968, pp. 260-263) identifies eight components of learning modules for individual instruction: "concepts, instructional objectives, multi-dimensional learning materials, diversified learning activities, pre-evaluation, self-evaluation, postevaluation, and quest." Klingstedt (1973) lists and describes six major parts of a learning module.

1. Objectives - are the behaviors, or performances, toward which the learner works
2. Pretest - to help the teacher and the learner determine if it is necessary to proceed through the module
3. Rationale - to establish the value of the learning module
4. Learning Alternatives - are designed to help the learner accomplish the objectives of the module
5. Posttest - designed to measure the learner's achievement of the objectives in the module
6. Resources Section - the place where all needed materials, media and readings are listed (pp. 62-67).

Learning modules should provide a way for learners to progress at their own rate in their own learning style, identify their strengths and weaknesses, and do again when objectives have not been met.

Related Research Using Learning Modules

Learning modules are not intended to be a panacea meeting the needs of all students. They can be effective if carefully developed and planned specifically to achieve the objectives cited. Warden and

Brandi (1981) in reporting a study to develop and evaluate a series of individualized modules for selected fundamental skills used in clothing construction state that

> Results indicated that: (1) individualized instruction may be a more effective mode of instruction than lecture-demonstration, (2) integrating individualized instruction into a regular class situation can be managed with some degree of success, and (3) the instructional modules were effective tools (p. 347).

In another related study in which students elected to study particular competency areas by either a teacher-directed approach or a student-directed modular approach, Cummings and Bell (1979) found that

> Students who selected the student-directed modular approach scored significantly higher in self-directedness than did those choosing the teacher-directed approach. The two groups did not vary significantly on the other variables. Comparison of students selecting teacher-directed instruction and student-directed instruction revealed no significant difference with regard to attitudinal gains but there was a significant difference in cognitive gains. Students in the teacher-directed group gained significantly more in the cognitive area than did those in the student-directed group (p. 163).

Culver (1973) recognizing the need of home economics materials for the sixth grade inclusion in middle schools developed UNIPACs in home economics pertaining to the area of personal finance. The UNIPACs were developed on the sixth grade reading level and were evaluated to determine if the materials were written at that level and to evaluate the success of the UNIPACs implemented in a middle school situation. Culver states

> The results of the study allowed the researcher to make these conclusions: 1. The UNIPACs that were developed on personal finance were at the sixth grade reading level; 2. The UNIPACs that were developed were effective in aiding pupils to learn concepts of personal finance (p. 49).

Gaffney (1971) in a study centered around development and evaluation of programed instructional components for three selected concepts in a college textile course found that programed instruction can be effectively utilized in the teaching of basic concepts in textiles. The study was done with two groups of students, one group using the developed programed components in textiles and the other group of students taught by the writer using the traditional lecture method. The study was implemented to meet the demands of increased enrollment and student demands of more information at a faster pace. Gaffney states "Programed instruction provides materials which permit efficient individual study with a limited amount of assistance" (p. iia). Gaffney, after using the Mann-Whitney U Test states

> The statistical analysis of the study involving achievement in textiles disclosed that the group using programed instruction scored significantly higher than the group using the traditional lecture method of teaching; it further revealed a trend favoring programed instruction as a method of learning (p. 81).

CHAPTER III

RESEARCH PROCEDURES

The objective of this study is to evaluate the input of competency-based modular instruction as an aid to student learning. The purpose is to assist the student in understanding the operation of a sewing machine as it pertains to its initial use in beginning to sew in clothing 1. The type of research design to be used is implemented to serve the complexity of the mobility of the students.

This chapter includes the development of a learning module specifically designed for use in beginning clothing at Margaret Hudson Alternate School for pregnant teenagers. It contains an instrument designed to collect and record data for use in evaluation and analysis of individual student participation. A pretest-posttest is formulated to determine the effectiveness of the module by measuring the significance in student achievement.

Type of Research Design

This study is a pre-experimental design characterized by the lack of a control group or equivalence of a control group. It is the one group pretest-posttest design implemented to evaluate the input of a competency-based learning module as an aid to learning the operation of a sewing machine. The effectiveness of the implementation of the learning module is measured by student achievement through the

use of pretest and posttest scores. One instrument is designed as the pretest and the posttest. To accomplish the objective, the module is composed of three lessons to be utilized until the student is ready to take the posttest.

Population and Sample

Participants in this study are secondary high school students, ages 13-19 years. They are enrolled in Homemaking 1 classes at Margaret Hudson Alternate School, Tulsa, Oklahoma, in the spring semester, 1982, due to pregnancy. Students are admitted through enrollment from any other Tulsa secondary school but may have entered that school from other Oklahoma school districts or from out of state. As of February 8, 1982, the enrollment statistics show that 122 students have enrolled at this time in the 1981-1982 school year. There have been 58 withdrawals leaving 64 students enrolled. This enrollment changes weekly as new students enter and others have babies and return to their home schools. The February 8, 1982 statistics show the student body is composed of 58 percent black, 33 percent white, 7 percent Indian, and 2 percent other. They are from multi-income levels and social backgrounds. They range academically from honor roll students to nonreaders. The sample is comprised of 24 students from the Homemaking 1 classes who were enrolled the week of March 15-19, 1982. Six others in the classes were not included in the sample due to one in absentia, two in absentia for giving birth, one for medical reasons and two were nonreaders.

Module Development

The learning module (Appendix B, p. 37) is developed to assist the student in understanding the operation of a sewing machine and performing the skill of operating the machine. The specific objectives of the learning module to achieve this response are 1) wind the bobbin and place correctly in the machine, 2) place the upper thread corectly on the machine, and 3) prepare the thread for stitching.

The competency of the individual student prior to using the learning module is determined by a pretest composed of a checklist for observation by the teacher (Appendix A, p. 34). If the student's response is not 100 percent correct, the student will use the learning module. The module is an individual learning package developed specifically for use with a Singer Model 201 sewing machine (Appendix B, p. 37). The module contains rationale to establish the value or purpose to the student. The three learning objectives the students will be able to accomplish upon completion of the module are stated. Three separate lessons are designed to visually illustrate each of the three objectives with directions for activities and procedures and a list of equipment needed to do the lessons. Upon completion of the three lessons, when the student thinks she knows how to perform the operations, she will demonstrate her competencies and the tester will use the posttest observation instrument to evaluate the student's competencies. If the student's score is 100 percent she will proceed to other assignments. If the student does not score 100 percent, she will repeat the module lessons and then retake the posttest.

Instrumentation

Since the educational objectives are in the psychomotor domain requiring perception or awareness of objects, and requirements of those objects in relationship to the mechanism of performing the operation and use of the sewing machine, the decision was made to develop a checklist for observation of the students' pre-sewing skills (Appendix A, p. 34). The checklist was developed to record each student's name in the class period, list the three objectives of the module, and the student's competency in performing the pre-sewing skills. If the student misses Part I on the test, they may take Part II. Because of the dependency of Part III on Parts I and II, module lessons I and II will have to be completed before doing Part III. This is necessary because both the bobbin thread and the upper thread must be in position before the machine is ready to stitch.

The observation checklist was designed to be used as the pre-test and posttest and the effectiveness of the use of the module was determined by the difference between the pretest and posttest scores of the students. The checklist was scrutinized by the researcher and two clothing teachers in the Tulsa Public Schools for content and effectiveness for classroom use. A trained observer, the teacher, administered the test to each student individually, recording the student's performance on the checklist as the observations were made and the directions for administering the test were followed.

Data and Analysis

Recorded data from the checklist for observation used to evaluate student competencies of operating a sewing machine (Appendix A, p. 34)

were charted to show the successfully performed competencies constituting the individual scores on Part I, Part II, and Part III. The scores on the pretest and posttests Part I and Part II were observed at 100 percent before the pretest on Part III was observed. If the student did not score 100 percent on Parts I, II, or III of the pretest the module lesson corresponding to that part of the checklist was given to the student to study. When the student felt competent to perform that part of the operation of the sewing machine, she asked the teacher to observe her demonstrate her competencies and was observed by the teacher who recorded her performance on the checklist. If the student followed the correct procedure a check was placed in the "correct" column. If the student did not follow the correct procedure or sequence, a check was placed in the "incorrect" column and the test was stopped. The use of the module lesson was repeated and the posttest was again observed. The number of students scoring 100 percent on each posttest was divided by the sample number to calculate the percentage of students who were competent on Posttest I or needed to repeat use of the module lessons and posttest the second and third time.

The one-group, pretest-posttest design of the pre-experimental designs of research was used (Best, 1981). The effects of the treatment were judged by the difference between the pretest and posttest scores of the sample group. Means were calculated by summing the test scores and dividing by the number of students comprising the sample. The mean difference between the pretest and each posttest was computed to find the mean gains.

CHAPTER IV

DISCUSSION AND ANALYSIS

The purpose of this study is to evaluate a competency-based learning module as a viable teaching alternative for teaching clothing construction to Homemaking I students. The specific objective guiding the study is to evaluate the input of competency-based modular instruction as an aid to student learning.

A competency-based learning module was developed to contain three objectives, 1) wind the bobbin and place correctly in the sewing machine, 2) place the upper thread correctly on the sewing machine, and 3) prepare the thread for stitching. These objectives were developed to include the same competencies in sequence that were to be measured by the instrument, the Checklist for Observation of Student Competencies of Operating a Sewing Machine (Appendix B, p. 37). The module lessons were formulated to correspond to the related parts of the instrument.

Data was obtained from 24 students enrolled in Homemaking I classes at Margaret Hudson Alternate School in Tulsa, Oklahoma, during the week of March 15-19, 1982. An analysis of the data, module implementation and student response is presented in this chapter.

Analysis of Observed Competencies

Teacher observations of the students' performance skills were

made individually. For the pretest each student was asked to take her spool of thread and bobbin to a sewing machine and do Part I wind the bobbin and place it correctly in the sewing machine, and Part II place the upper thread correctly on the sewing machine. The pretest for Part III prepare the thread for stitching was delayed until the student had successfully performed Part I and Part II. Part III is totally dependent upon completion of Part I and Part II for its implementation.

While observing the student's performance of pre-sewing skills for the pretest, the student was stopped at any point where she did not start correctly or missed a step in the correct procedure. The student was then given the corresponding module lesson to study and was instructed to request the posttest when she thought she could successfully perform the pre-sewing skills contained in the module lesson. The student was given no help from the observer except for malfunction of equipment. Observation of the students' skills to perform the competencies on the pretest and posttest, and the need for repeated use of the module lessons and repeated posttests were tabulated using the successful performance of the 25 competencies for a perfect score (Table I). The students' scores were further tabulated on a 100 percent basis by multiplying by four. The distribution of the students' pretest scores and the posttest scores the first time given are shown in Table II.

Students' percentage scores on the pretest range from 0 to 24 with only four students scoring above 0. Some students said they had not sewn on a sewing machine. Others indicated they were not familiar with the model of the sewing machine, could not remember the procedures or did not follow correct procedures.

TABLE I

INDIVIDUAL STUDENT COMPETENCIES DEMONSTRATED ON PRETEST AND POSTTEST

Student	Pretest Part I	Pretest II	Pretest III	Pretest Total	Posttest I Part I	Posttest I II	Posttest I III[a]	Posttest I Total	Posttest II Part I[a]	Posttest II II[a]	Posttest II III[a]	Posttest II Total	Posttest III Part I[a]	Posttest III II[a]	Posttest III III[a]	Posttest III Total
1	0	0	0	0	0	9	2	11	7	-	4	20	12	-	-	25
2	0	0	0	0	0	0	4	4	8	9	-	21	12	-	-	25
3	0	0	0	0	12	9	4	25	-	-	-	-	-	-	-	-
4	0	0	0	0	12	9	4	25	-	-	-	-	-	-	-	-
5	0	0	0	0	0	9	0	9	4	-	4	17	12	-	-	25
6	0	4	0	4	0	9	4	13	7	-	-	20	12	-	-	25
7	0	0	0	0	12	0	0	12	-	8	4	24	-	9	-	25
8	0	0	0	0	12	9	0	21	-	-	0	21	-	-	4	25
9	0	0	0	0	4	4	0	8	8	9	4	21	12	-	-	25
10	0	0	0	0	12	9	4	25	-	-	-	-	-	-	-	-
11	0	0	0	0	5	9	0	14	10	-	4	23	12	-	-	25
12	0	0	0	0	0	9	2	11	7	-	2	18	12	-	4	25
13	0	0	0	0	8	9	4	21	12	-	-	25	-	-	-	-
14	0	0	4	4	7	9	-	20	12	9	-	25	-	-	-	-
15	0	0	0	0	12	9	4	25	-	-	-	-	-	-	-	-
16	0	0	0	0	7	6	4	17	12	9	-	25	-	-	-	-
17	0	0	0	0	12	9	4	25	-	-	-	-	-	-	-	-
18	2	0	4	6	9	9	-	20	12	-	-	25	-	-	-	-
19	0	0	4	4	7	9	-	20	12	-	-	25	-	-	-	-
20	0	0	0	0	12	9	4	25	-	-	-	-	-	-	-	-
21	0	0	0	0	7	9	4	20	12	-	-	25	-	-	-	-
22	0	0	0	0	0	9	4	13	12	-	-	25	-	-	-	-
23	0	0	0	0	12	9	4	25	-	-	-	-	-	-	-	-
24	0	0	0	0	12	9	4	25	-	-	-	-	-	-	-	-

[a]-Indicates student achieved all 25 competencies.

NOTE:

100 Percent

Pretest or Posttest			
Part			
I	II	III	Total
12	9	4	25

There are 12 competencies in Part I, 9 competencies in Part II and 4 competencies in Part III totaling 25 competencies for a pretest or posttest score of 100 percent.

TABLE II

STUDENT PRETEST AND POSTTEST SCORES BY PERCENT ON PARTS I, II, III

Student	Pretest Score[a]	Posttest Score[b]	Difference	Student	Pretest Score[a]	Posttest Score[b]	Difference
1	0	44	44	13	0	84	84
2	0	16	16	14	16	80	64
3	0	100	100	15	0	100	100
4	0	100	100	16	0	68	68
5	0	36	36	17	0	100	100
6	16	52	36	18	24	88	64
7	0	48	48	19	16	80	64
8	0	84	84	20	0	100	100
9	0	32	32	21	0	80	80
10	0	100	100	22	0	52	52
11	0	56	56	23	0	100	100
12	0	44	44	24	0	100	100

[a]Pretest score prior to using module

[b]Posttest score upon completion of the learning module one time

Eight of the 24 students scored 100 percent the first time the posttest was given after using the module lessons. The remaining 16 students repeated the module lessons, took the posttest the second time and seven scored 100 percent. The remaining nine students repeated the module lessons and the posttest the third time and all scored 100 percent. Two students did not do Lesson III of the module since they scored 100 percent on the pretest to Lesson III. A distribution of scores showing how each student scored on the pretest which was given only one time and on the posttest given the first, second and third time are shown in Table III.

Thirty-three percent of the class scored 100 percent on Posttest I, 29 percent scored 100 percent on Posttest II and 37½ percent scored 100 percent on Posttest III. All students were observed as 100 percent successful at the end of Posttest III as indicated in Table IV.

TABLE III

DISTRIBUTION OF THE PRETEST SCORE AND POSTTEST SCORES GIVEN THE FIRST, SECOND AND THIRD TIME TO TWENTY-FOUR STUDENTS

Student	Pretest %	Posttest I %	D_a	Posttest II %	D_a	Posttest III %	D
1	0	44	44	80	80	100	100
2	0	16	16	84	84	100	100
3	0	100	100				
4	0	100	100				
5	0	36	36	68	68	100	100
6	16	52	36	80	64	100	84
7	0	48	48	96	96	100	100
8	0	84	84	84	84	100	100
9	0	32	32	84	84	100	100
10	0	100	100				
11	0	56	56	92	92	100	100
12	0	44	44	72	72	100	100
13	0	84	84	100	100		
14	16	80	64	100	84		
15	0	100	100				
16	0	68	68	100	100		
17	0	100	100				
18	24	88	64	100	76		
19	16	80	64	100	84		
20	0	100	100				
21	0	80	80	100	100		
22	0	52	52	100	100		
23	0	100	100				
24	0	100	100				

D_a = Difference

Note: Possible score of pretest and posttest is 100 percent. The posttest was observed the second and third time following use of the module as needed by individual students.

TABLE IV

NUMBER AND PERCENTAGE OF STUDENTS WHO SCORED 100 PERCENT ON POSTTESTS

Test	N	Percent of Sample
Posttest I	8	.333
Posttest II	7	.291
Posttest III	9	.375
Total	24	.999[a]

[a]Total does not equal 100 percent because of rounding.

The mean was computed for the pretest and each of the three posttests. Each student's percentage score was added with other students' percentage scores and divided by the number of students performing in the test or that part of the test to obtain the mean. The mean difference between the pretest and the first posttest given found that the mean had increased from 3 to 72.66, a mean gain of 69.66 percent. The difference in the pretest mean and the second posttest mean was an increase from 3 to 90, a mean gain of 87, and the difference in the pretest mean and the third posttest mean was an increase from 3 to 100, an increase of 97 percent (see Table V).

TABLE V

MEAN DIFFERENCE BETWEEN THE PRETEST AND POSTTESTS SCORES

Test	N	Score	Mean	Mean Gain for Posttest
Pretest	24	72	3	
Posttest I	24	1744	72.66	69.66
Posttest II	16	1440	90	87
Posttest III	9	900	100	97

Student Responses to the Module

Students using the module showed an expressed eagerness to accomplish the objectives. This is illustrated by a student comment "I just

did it!" when the bobbin started winding. Thoughts were expressed in a comment "I don't understand this . . . wait a minute, OK." Motivation was observed by the directness in the way students entered the classroom, obtained the module lessons they needed and immediately went to work to complete them and pass the posttest. There was apparent determination to achieve the objectives since they knew they would not be allowed to begin sewing until they could do so. They wanted to begin making the sewing projects displayed in class. Competition developed among some students although they were working on an individual basis to perform the competencies. There were challenges to beat other students or friends in completing module lessons and for passing the posttest.

Summary

The purpose of this study was to evaluate if competency-based independent study modules are a viable teaching supplement for teaching clothing construction in Homemaking I. The specific objective was to evaluate the input of competency-based modular instruction as a teaching aid. A student learning module for operating a sewing machine was developed with the purpose to help the student understand how the machine operates.

The sample was composed of 24 students enrolled in Homemaking I classes at Margaret Hudson Alternate School, Tulsa, Oklahoma, during the week of March 15-19, 1982. The school has a transient student body since it is comprised of pregnant teenagers. Enrollment may begin at any period of pregnancy and the withdrawal from school is six weeks following birth of the baby. Individualized instruction is

essential; therefore, the need for modular instruction as an aid is apparent.

The learning objectives of the module were: 1) wind the bobbin and place it correctly in the sewing machine, 2) place the upper thread correctly on the sewing machine, and 3) prepare the thread for stitching. The module was developed in three lessons, each lesson containing the competencies required to accomplish one of the three learning objectives of the module. Directions and illustrations were used to help the student understand the correct procedure to follow in using the module and learning the competencies.

All students were given the pretest. Those not making 100 percent used the module lessons and then took a posttest. After failing to score 100 percent on any part of the posttest, they studied the module lessons again until they were able to score 100 percent. Results showed the mean gain of 69.6 percent between the pretest and the first posttest with eight students scoring 100 percent. The mean gain of the remaining 16 students increased 87 percent with seven of this number scoring 100 percent when they took the posttest the second time. The remaining nine students scored 100 percent the third time they took the posttest for a mean gain of 97 percent.

The competency-based module is an aid which can help students develop the skill of learning how the sewing machine operates in clothing construction classes in Homemaking I. It generated interest in achieving and accomplishing the objectives of the module lessons. It allowed the student to work individually at her own rate of speed and ability. The module provided motivation, active participation, and meaningful material as an aid to the learner.

Recommendations

1. Use this study in the classroom for a semester or a year period of time and evaluate the effectiveness as a teaching supplement with more students and more observation of use.

2. Develop an extended module or other modules to attain further objectives in stitching skills such as regulating stitch length, backstitching a few stitches to reinforce the ends of a seam, stitching a plain seam and illustrating different seam widths.

3. Develop other modules to include the use of an individual film viewer/cassette player for viewing filmstrips on selected techniques in clothing construction.

4. Do a follow-up study to measure retention of skills learned through use of the independent learning module of operating a sewing machine following a selected number of weeks of clothing construction.

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APPENDIXES

APPENDIX A

CHECKLIST FOR OBSERVATION OF STUDENT COMPETENCIES OF OPERATING A SEWING MACHINE

Checklist for Observation of Student Competencies

of Operating a Sewing Machine

Directions to Observer: Place a check in the "C" column if the student follows the correct procedure or a check in the "I" column if the procedure is incorrect. When the student misses a step in the sequence of Part I and Part II the test is stopped. If the student is stopped in Part I, start this student on Part II; if the student passes Part II do not let the student start Part III until she completes Module Lesson I. If the student does not pass Part II, she completes Module Lesson II before she starts Part III.

Student Name _____ Pretest _____

Class Period _____Date _____ Posttest _____

	C	I
Part 1. Wind the bobbin and place correctly in the machine A. Wind the bobbin 1. Loosen the thumb screw on the backside of the handwheel to stop the needle from going up and down		
2. Place bobbin on the bobbin winder and snap it into position by pushing it against machine		
3. Place your spool of thread on the bobbin thread pin and pull the thread through the thread guide		
4. Put the thread through the small hole in the side of the bobbin, from the center of the bobbin to the outside. Hold this thread with your left hand		
5. Push your right knee against the knee lever and watch the thread wind (when the bobbin is full it will snap out of position or you may stop with any amount of thread on the machine)		
6. Cut the thread between the spool and the bobbin		
7. Remove the bobbin for placement in the bobbin case		
8. Tighten the thumb screw on the handwheel to make the needle go up and down		
B. Place bobbin correctly in the machine 9. Determine the correct direction the thread is pulling from the bobbin when being placed in the bobbin case		
10. Place the bobbin into the bobbin case and draw the thread into the slot in the bobbin case		
11. Draw thread toward you between bobbin case and tension spring until it passes the notch in the bobbin case		
12. Close the slide plate leaving the thread extending outside in the long notch in the right edge of the slide plate		

	C	I
Part II. Place the upper thread correctly on the machine 1. Raise the take-up lever to its highest position		
2. Place your spool of thread on the spool pin		
3. Pull the thread through the top thread guide		
4. Continue pulling it down under and from right to left between tension discs		
5. Draw thread into take-up wire		
6. Draw thread up to take-up lever and pass thread from right to left through hole		
7. Bring thread down through the three thread guides		
8. Pass thread from right to left through the eye of the needle		
9. Draw two to three inches of thread through the needle		
Part III. Prepare the thread for stitching 1. Hold the needle thread with left hand		
2. Turn the handwheel <u>toward</u> you until the needle goes down and up to its highest point		
3. Pull the upper thread you are holding in your left hand and the bobbin thread will be drawn through the needle hole		
4. Pull both needle and bobbin threads under the presser foot and behind the machine		

APPENDIX B

STUDENT LEARNING MODULE FOR SEWING MACHINE OPERATION

Area: Clothing

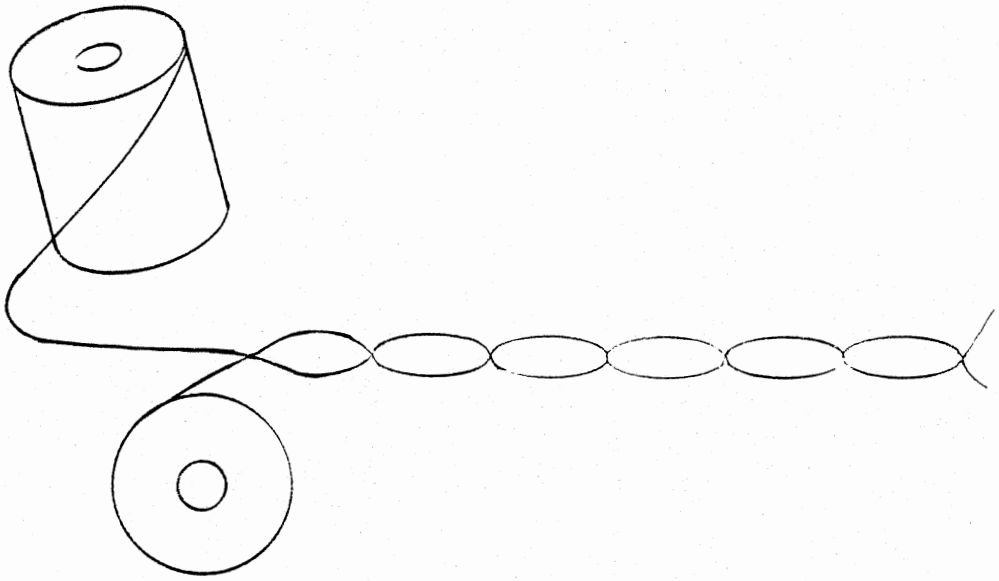
Level: Clothing Construction I

INTRODUCTION: The first step in sewing class, before sewing on a project, is to learn how to operate the sewing machine. To learn to sew with ease and fewer problems with the sewing machine, you need to learn to operate the machine correctly.

PURPOSE: This learning module is to help you understand how the sewing machine operates.

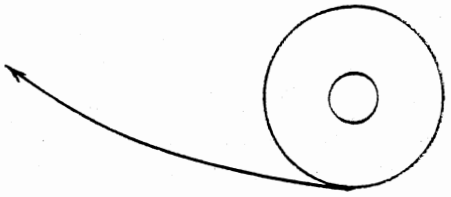
LEARNING OBJECTIVES: When you complete the three lessons in this module you will be able to do the following:
1. Wind the bobbin and place correctly in the machine
2. Place the upper thread correctly on the machine
3. Prepare the thread for stitching

ITEMS NEEDED: To do the three lessons you will need:
1. Thread for sewing
2. Bobbin for a Singer #201
3. Scissors



LESSON I

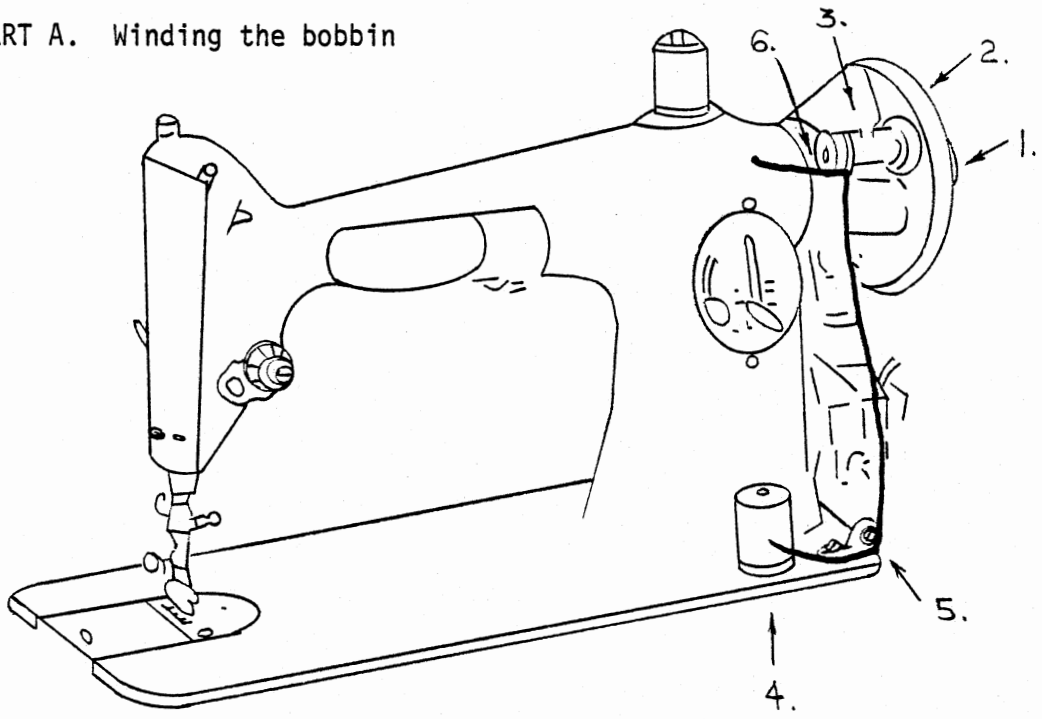
OBJECTIVE: Wind the bobbin and place correctly in the machine.



Bobbin with thread pulling from the bobbin clockwise

DIRECTIONS: Take your bobbin, thread, scissors and this lesson and sit at a sewing machine. Use the picture below and let the numbers guide you. The darker line is the path of the thread.

PART A. Winding the bobbin



- Loosen the thumb screw (1) on the backside of the handwheel (2) to stop the needle from going up and down.
- Place bobbin on the bobbin winder (3) and snap it into position by pushing it against machine.
- Place your spool of thread on the bobbin thread pin (4) and pull the thread through the thread guide (5).
- Put the thread through the small hole in the side of the bobbin (6) from the center of the bottom to the outside. Hold this thread with your left hand.

- Push your right knee against the knee lever and watch the thread wind. (When the bobbin is full it will snap out of position or you may stop with any amount of thread on the bobbin.)

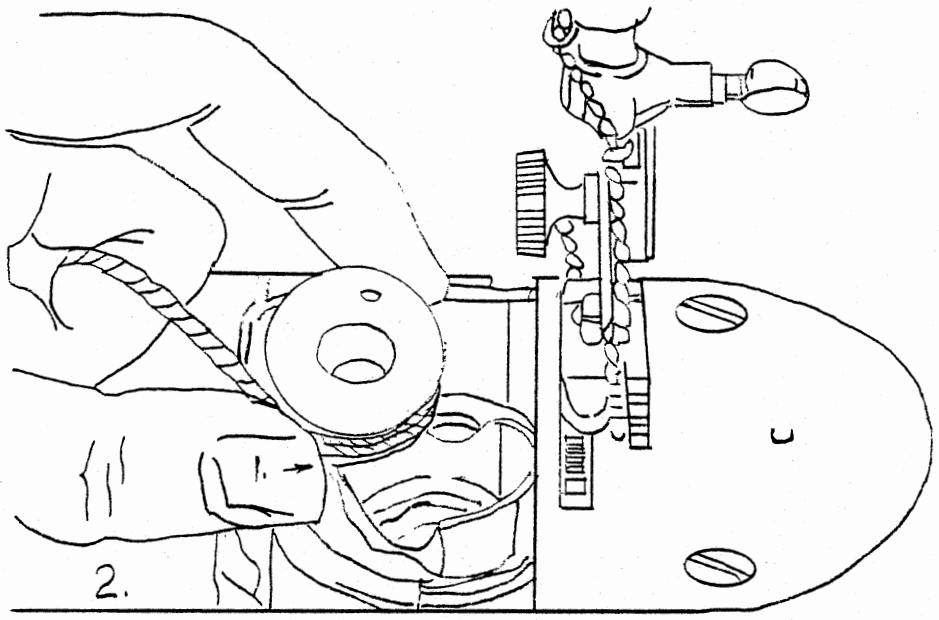
- Cut the thread between the spool and the bobbin.

- Remove the bobbin for placement in the bobbin case.

- Tighten the thumb screw (1) on the handwheel (2) to make the needle go up and down.

DIRECTIONS: Use the picture below as a guide to the correct direction the thread is pulling from the bobbin when being placed in the bobbin case - clockwise - as hands on a clock.

PART B. Placing bobbin correctly in the machine.



- Place the bobbin into the bobbin case and draw the thread into the slot in the bobbin case.

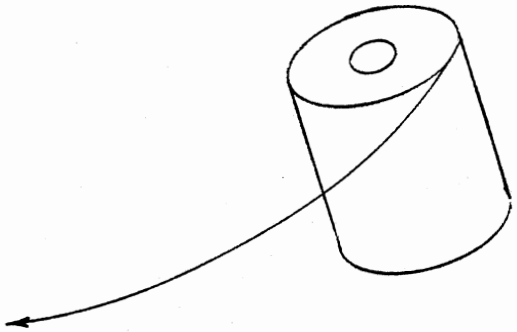
- Draw thread toward you between bobbin case and tension spring until it passes the notch in the bobbin case (1).

- Close the slide (2) leaving the thread extending outside in the long notch in the right edge of the slide plate.

YOU HAVE COMPLETED LESSON I. YOU WILL NEED TO DO LESSON II AND LESSON III BEFORE YOU ARE READY TO OPERATE YOUR SEWING MACHINE.

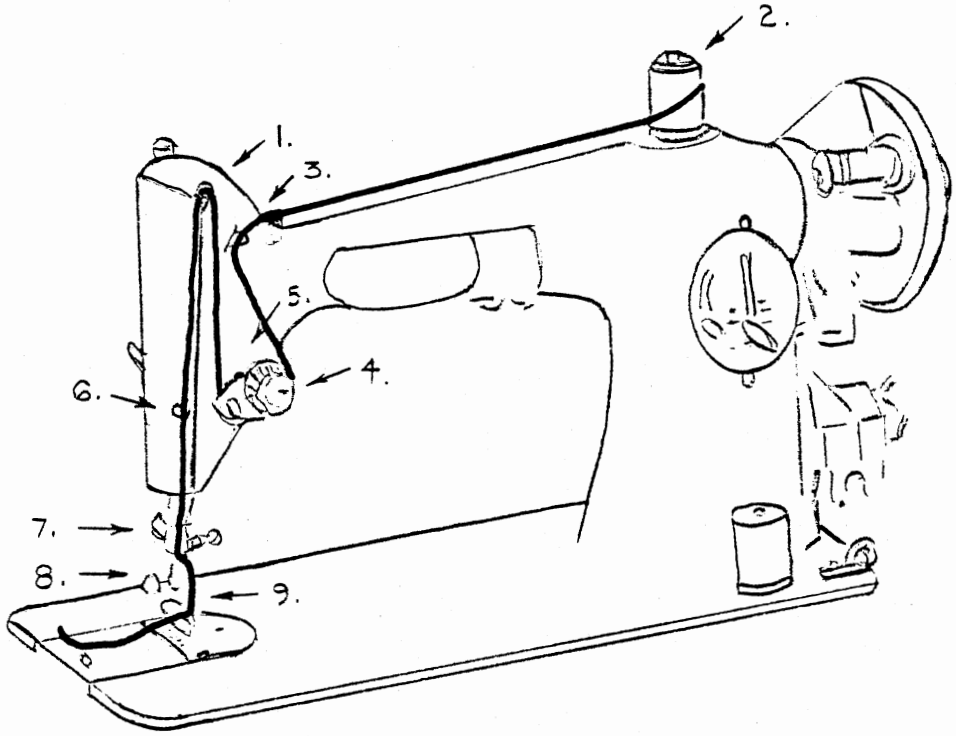
LESSON II

OBJECTIVE: Place the upper thread correctly on the machine.



Spool of thread with thread pulling in the direction for threading

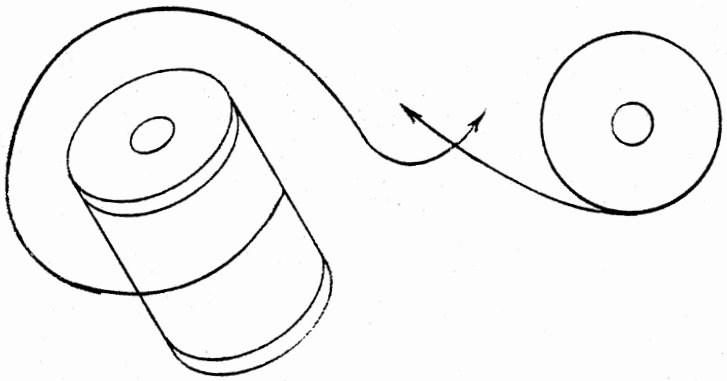
DIRECTIONS: At your machine, with your filled bobbin correctly in place, use the picture below to let the numbers guide you. The darker line is the path of the thread.



- Use the handwheel and raise the take-up lever (1) to its highest point.
- Place your spool of thread on the spool pin (2).
- Pull the thread through the top thread guide (3).
- Continue pulling it down under and from right to left between tension discs (4).
- Draw thread into take-up wire (5).

- Draw thread up to take-up lever (1) and pass through hole.
- Bring thread down through guides (6), (7) and (8).
- Pass thread from right to left through eye of the needle (9).
- Draw about three inches of thread through the needle.

CONGRATULATIONS! YOU HAVE JUST COMPLETED LESSON II. YOU MAY GO TO LESSON III.

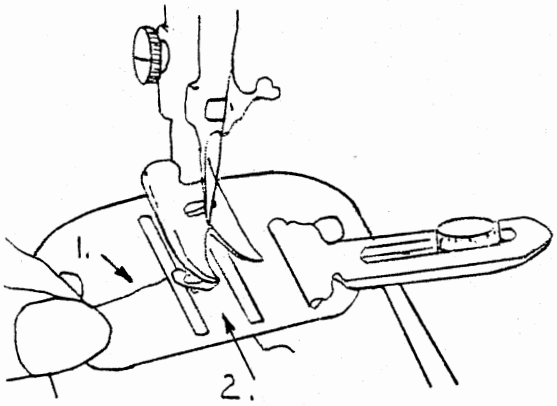


Upper thread and bobbin thread - together they form the stitches when operating the sewing machine.

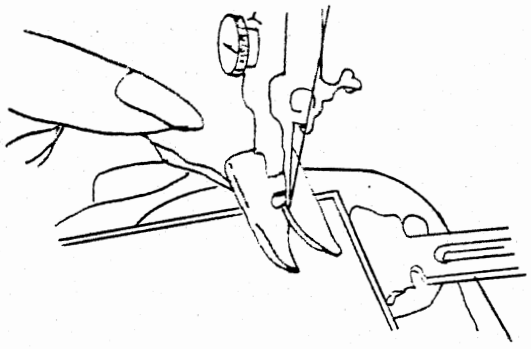
LESSON III

OBJECTIVE: Prepare the thread for stitching

DIRECTIONS: With your filled bobbin correctly in place and the upper thread correctly on the machine, look at the pictures below to help you start sewing - trouble free.



- Hold the needle thread with left hand (1).
- Turn the handwheel toward you until the needle goes down and up to its highest point (Lesson I).
- Pull the thread you are holding in your left hand and the bobbin thread will be drawn through the needle hole in the throat plate.



- Pull both the needle and bobbin threads under the presser foot and behind the machine.

YOU HAVE COMPLETED LESSON III. IF YOU THINK THAT YOU CAN DO ALL THREE LESSONS CORRECTLY, ASK YOUR TEACHER TO TEST YOU. GOOD LUCK!

VITA 2

Norma Sue Ball

Candidate for the Degree of

Master of Science

Thesis: A COMPETENCY-BASED MODULE FOR SEWING MACHINE OPERATION

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