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COMPARISON OF TWO SELF-STUDY TECHNIQUES  
FOR QUANTITY FOOD PRODUCTION

by 6791

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A MASTER'S THESIS

submitted in partial fulfillment of the

requirements for the degree

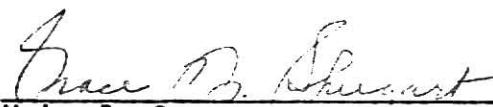
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## INTRODUCTION

Increased demand for food service personnel on the professional, supervisory, and employee level is challenging educators to examine and evaluate present curriculums and methods of instruction. New teaching techniques are being considered for more efficient use of teacher and student time, especially in courses with laboratory experiences.

Basic to most curriculums in food service management is a course in quantity food preparation. Objectives of this course for professional education generally relate to application of principles as opposed to development of skills for the technician. To efficiently utilize class hours, students should obtain basic knowledge and principles of quantity food preparation prior to laboratory experience. Standardized recipes used in a quantity foods laboratory may not provide adequate instructions for combining ingredients. The assumption in many recipe instructions is that the reader knows how to perform basic techniques.

Independent study programs could be an approach to accommodate students with varied knowledge and experience backgrounds and to utilize student and teacher time effectively. The purpose of this study was to develop two self-instruction programs for a college-level quantity food preparation course and to compare their effectiveness.

## REVIEW OF LITERATURE

Methods of teaching at all grade levels are being changed as a result of increased numbers of students, increases in knowledge, and advances in communication media (Tope, 1969). These changes are forcing educators to re-evaluate old instructional methods and examine new teaching media. To

meet the needs of large numbers of students, a new rationale for teaching is being adopted and advances in educational technology are developing (Wedemeyer, 1968).

### Individualized Instruction

The new trend in education is toward teaching systems with the individual student as the center (Wedemeyer, 1968). Teaching systems are integrated multi-media programs emphasizing the importance of individual learning rather than teaching. Mertens (1969) includes in individualized instruction programs, tutorials, seminars, research, and laboratory experiences that will develop competencies through individual experiences. One type of relevant and individualized instruction is programmed instruction.

Programmed Instruction. Programmed instruction has been used in many different modes of presentation varying from machines to textbooks. For today's educator, Pipe (1966) considered it more important to examine the "software," the characteristics and types of instruction, than the "hardware," which includes modes of presentation. There are many different types of programmed instruction, all having the same basic characteristics. These characteristics common to programmed instruction as listed by Pipe (1966) are: (1) small steps, (2) active participation, (3) immediate knowledge of results, (4) self pacing.

The many methods of programming based on different learning theories are designed to produce specific changes in behavior. Five main types of programming, each with a different step size, learning theory, response mode, reinforcement mode, and use are presented in Table 1.

Linear programming. Skinner (1954) based his linear programming on the principle of carefully guiding the learner through small learning steps and

Table 1. Comparison of five types of programming.<sup>1</sup>

| Type of programming        | Size of step | Learning theory                                  | Response mode | Reinforcement mode                            | Uses                                  |
|----------------------------|--------------|--|---------------|---|---------------------------------------|
| Linear (Skinner, 1954)     | Small        | Correct behaviors are reinforced                 | Overt         | Correct answers                               | Apodictic subject matter (Math)       |
| Branching (Crowder, 1959)  | Large        | Correctional instructions for wrong answers      | Covert        | Correctional instructions or correct response | Contingent subject matter (Sociology) |
| Adaptive (Pask, 1958)      | Small        | Performance determines presentation by computer  | Overt         | Computer                                      | Repetitive skills                     |
| Mathetic (Gilbert, 1962)   | Varies       | Total concept presented, last step studied first | Varies        | Varies  | Complex, multi-faceted skills         |
| Adjunctive (Pressey, 1927) | Varies       | Built to a pre-existing body of knowledge        | Varies        | Varies  | To test Literature or History         |

<sup>1</sup>Adapted from Chidester (1967).

reinforcing each correct answer with a favorable experience. The student is given a small amount of information, he answers a question, and the correct response is revealed (Pipe, 1966). Each step is small and may contain "prompts" or cues to assure a correct response. With this type of programming, Pipe indicated the student may become bored easily as these programs often are dull and progress slowly.

Principles of linear programming were applied by Marovich (1965) to the teaching of a college-level course in food science. Four topics, heat transfer, heating media and methods of cooking, dispersions, and high protein foods, were presented in programmed textbook form to sixteen junior students. Upon completion of the programs, half of the students felt the programs were moderately easy, the remaining half rated the programs as moderately difficult. Students in this study believed there was little variation in the presentation of the frames and the programs should be used only to supplement lectures or textbooks.

A programmed textbook to instruct food service employees in the correct methods of dishing pies and cleaning a food slicer was developed and tested by Sumbingco (1967). Eleven food service employees evaluated this method of instruction as being effective.

Branching programming. Linear programming does not attempt to correct student responses; whereas, branching programming provides additional instructions for incorrect responses. This type of programming, developed by Crowder (1959), presents more information at each step than is given in linear programs. The student completing a branching program reads the information presented, selects an answer to a multiple choice question and is then given additional instruction if his answer is incorrect. If the student

answers correctly, he is permitted to proceed to the next instructional sequence. This type of programming is based on the belief that teaching and learning are communication processes and is written in a conversational style (Pipe, 1966).

Adaptive programming. In England, Pask (1958) developed a type of programming utilizing the computer to teach keyboard skills. The adaptive type of programming is composed of three units; a television-type screen, a student keyboard, and the computer. The screen presents a set of characters the student is to punch out on the keyboard. The computer collates student responses and determines what is to be presented. Adaptive programming is an expensive method of instruction because of the high cost of computer use (Chidester, 1967).

Mathetic programming. Gilbert (1962) developed a method of programmed instruction that presents the end result to the student. The last step in the process is learned by the student in relation to the whole concept being studied. The next to the last step then is learned in relation to the last step and the entire process. The response mode, reinforcement mode, and size of step will vary among mathetic programs.

Adjunctive programming. Pressey (1927) introduced adjunctive programming in the form of a teaching machine that would give and score tests. In 1964, Pressey and Kinzer pointed out the advantages of this type of programming when used as a method of self instruction. The student may be required to study a lengthy document before completing the adjunctive program. After studying the literary work, the student completes the program and is informed of the correct answers.

Audio-tutorial Systems. The audio-tutorial system of teaching is a multi-sensory approach to teaching utilizing all educational devices



available (Postlethwait et al., 1969). This type of individualized instruction provides a wide range of learning experiences planned to effectively present the information to be learned. The learning progression characteristic of programmed instruction is utilized in the method of instruction. Each skill or bit of information presented is learned and retained as background material for the next learning sequence. The center of an audio-tutorial system of instruction is an audio taped recording by the instructor that provides information and definitions. The tape provides the students with voice intonations that place emphasis on the important points. This emphasis is lacking when the student reads the written words. The audio tape was first used in 1961 by Postlethwait to inform students of material supplemental to class lectures. Presently audio tapes are used to teach an entire course, presenting important information and referring the student to experiments, articles, and textbooks. Thirteen advantages to the audio-tutorial approach to teaching were listed by Postlethwait et al. (1969):

1. Emphasis on student learning rather than on teaching.
2. Students can adapt the study pace to their ability to assimilate the information. Exposure to difficult subjects are repeated as often as necessary for any particular student.
3. Better students are not a "captive audience" and can use their time most effectively. Their interests are not dulled by unnecessary repetition of information already learned but they are free to choose those activities which are more challenging and instructive.
4. The student can select a listening time adapted to his diurnal efficiency peak.
5. Tapes demand the attention of the students. Students are not distracted by each other.
6. Students have more individual attention, if they desire it.
7. Scheduling problems are simplified. The four hours of scheduled time from which the students are relieved under the new system are now distributed throughout the week as necessary to adjust to the student's activities.
8. More students can be accommodated in less laboratory space with less staff.
9. Make-up labs and review sessions can be accommodated with a minimum of effort.

10. The student feels more keenly his responsibility for his own learning.
11. Each student is essentially "tutored" by a senior staff member.
12. Potentially, the system can be used to standardize instruction where desirable.
13. Opportunities for research on learning processes is enhanced.

Tope (1969) applied the audio-tutorial approach to the teaching of a college-level foods course. The audio tapes developed contained a discussion of subject matter and directions for exercises and experiments to be performed in the laboratory. In this study, students completing the audio-tutorial programs performed as well as students taught by conventional methods. Students in both groups spent the same amount of time in the laboratory. Reactions to the audio-tutorial programs were generally favorable and increased during the semester (Tope, 1969).

A self-instruction laboratory was developed for a beginning foods course at Syracuse University (Short et al., 1969). Commercially prepared materials were adapted for college-level instruction while additional programs were produced utilizing a variety of media. Worksheets for each lecture were created to aid students in the use of the laboratory. These sheets contained objectives and outline of the unit, questions to answer, diagrams to label, and directions for the laboratory work (Short, 1970a). Information sheets for each visual presentation were available so that the student could be fully attentive to the presentation, making note taking unnecessary. In a doctoral dissertation, Short (1971) stated that self-instruction materials can be used successfully in place of lecture-demonstration presentations characteristic of conventional courses. Additional units utilizing branching programming by computer also were prepared (Short, 1970b). The results of all investigations by Short show that 97 percent of the students can successfully complete the program the first time. The remaining 3 percent pass

after the second participation. Students seemed to be less confused in the laboratory after viewing the programs than were those taught by conventional techniques.

The audio-tutorial system is being used at Oklahoma State University in a beginning clothing course (Sisler, 1970). The course consists of one weekly lecture after which students are allowed to attend a self instruction laboratory. An audio tape presents the lesson to the students and refers them to displays, slides, films, or filmstrips. Question sheets that aid student notetaking are available for each lesson. The evaluation of this study including over 200 students showed that the audio-tutorial instructions were preferred over the lecture. Twenty-seven percent of the students recommended that the entire course be presented by the audio-tutorial system. McAlister and Sisler (1971) reported a college-wide expansion of the audio-tutorial system to a Home Economics Independent Learning Center. This center houses 23 courses presented by audio-tutorial methods and is well used by students enrolled in these courses. The average study time spent at one sitting by the students in this center is 40 minutes (McAlister and Sisler, 1971).

Johnson et al. (1969) wrote a program of instruction to teach basic clothing construction. At various places during the program, students are referred to important visual and tactile displays. The performance of program-taught students was superior to that of teacher-taught students on all variables investigated. The program-taught students also could transfer their learning to new situations more effectively than the teacher-taught students.

Home Economics Learning Packages (HELPS) developed for the American Home Economics Association are teacher prepared packages covering one unit or

topic broken into three to five lessons (Shear and Ray, 1969). The student using these packages may learn at his own pace, selecting from various resource materials and activities listed in the HELP. These packages generally include: (1) concept, (2) instructional or behavioral objectives, (3) multidimensional learning materials, (4) diversified learning activities, (5) evaluation activities, (6) optional quest suggestions. Shear (1971) concluded that learning packages may be effective self instruction methods when used appropriately.

Slide and Tape Programs. A slide and tape program to teach food service employees two motion patterns for breading foods was produced by Middleton and Konz (1965). Slides developed for this program were self explanatory and could be used alone or supplemented with a tape containing oral instructions. The authors concluded that the slide and tape program may help solve the problem of training food service employees.

Apley (1968) developed and evaluated an audio-visual program covering banquet service for food service personnel. The presentation, augmented by guided practice, was an effective training technique that combined the hearing of instructions, the viewing of demonstration slides, and the practicing of procedures.

A program utilizing slides to instruct food service employees in the correct operation of a flight-type dishwasher was produced by Kahl (1968). Employees were divided into two groups. One group viewed the slides and practiced the steps; whereas, the second group viewed the slides and recorded answers to questions in a booklet. The first group had fewer errors and required less time to correctly operate the dish machine than the second group.

These three studies reinforce the statement of McAlister and Sisler (1971) that individuals learn 50 percent of what they see and hear, 20 percent of what they hear, and 30 percent of what they see.

Task-unit Concept. The Task-unit concept, developed by Welch (1966), breaks each task into operations and processes. In this method of instruction, the individual learns through experience. To adapt the Task-unit concept to food preparation, Related Technical Information (RTI) sheets, which contain all information needed to implement the methods of combining the recipe ingredients, were developed. All tasks were identified and divided into operations or processes. RTI sheets, containing columns for "what to do" and "how to do it," describe the processes and operations.

Titus (1969) tested RTI sheets with food service employees. Workers using RTI sheets with a plain cake recipe produced higher quality products than workers using the recipe alone. Based on this study, RTI sheets in addition to the recipe could be an effective method of employee training.

#### Education of Dietitians

The health professions today are expanding to meet the growth in demand for health services. Piper (1969) cited three steps in a "career ladder" for the dietetic profession: the food service supervisor, with on-the-job training or less than two years of specialized education; the dietary technician, with an associate degree; and the dietitian with a baccalaureate degree. Courses required for most undergraduate programs in dietetics were categorized by Miller (1960a) into five major classes; the sciences, the humanities, communication arts, home and family life, and specialized subjects basic to the profession. Basic courses for professional development include basic

food preparation, meal management, human nutrition, experimental foods, quantity food preparation, organization and management, purchasing procedures, and institutional equipment. A basic course in quantity food preparation is essential to all curriculums and must provide a meaningful background of information to all students. Many times the students in their first course in institutional management have various backgrounds and interests in food service, making the teaching of this course difficult.

Miller (1960b) surveyed graduates, administrators, and educators covering the academic preparation of college graduates in food service management. Management skills and technical skills were evaluated by those questioned. Included in the "technical skills" category was food preparation in quantity and factors affecting quality. Graduates employed in food service management positions were judged by employers to have inadequate backgrounds in quantity food preparation and factors affecting quality. This indicates an area for improving the instruction of dietitians.

#### Standardized Recipes, Methods and Instructions

Standardization of recipes helps to assure the same quality product each time the recipe is prepared (Corbitt, 1959). One of the most important parts of the recipe is the detailed instructions for preparation (Shugart, 1962). The methods in combining ingredients must be carefully analyzed, broken down into steps, and placed in logical order (American Hospital Association, 1966). Once analyzed, the steps should be stated briefly and clearly (Janssen, 1958). In choosing wording for instructions, it is important that each word means explicitly what is intended (Aldrich, 1955). All of these authors emphasized the importance of methods of combining ingredients as stated in the instructions.

### Methods of Preparing Biscuits

Biscuit dough is classified as a soft dough, one containing three parts flour to one part liquid (West et al., 1967). The biscuit method of combining ingredients as outlined by Peckham (1964) is;

1. Dry ingredients mixed together.
2. Solid fat cut into dry ingredients.
3. Liquid added and stirred until dough adheres together.
4. Dough formed into a ball, turned onto a floured board, and kneaded slightly.

Dough is then lightly rolled to an even thickness and individual biscuits are cut with an even pressure. Overmixing and overkneading biscuit dough will produce biscuits that are tough and unacceptable (Terrell, 1971; Kotschevar, 1966). There are two standards for biscuits: crusty biscuits with a soft tender crumb that is not flaky, and biscuits with a larger volume, a flaky crumb and a more bread-like texture (Griswold, 1962). A biscuit should be well-shaped with straight, even sides and a level top. The crust should be tender and an even golden brown (Kotschevar, 1966). With a quality recipe and accurate instructions, standards of quality can be met consistently (Aldrich and Miller, 1967).

### PROCEDURE

#### Development of Programs

Detailed instructions for preparing baking powder biscuits were developed for two self-instruction programs. Baking powder biscuits were chosen for this study because of the ease of combining ingredients while requiring the knowledge of a few techniques. The two programs were developed to teach college students a standardized method of preparing baking powder biscuits in a quantity for fifty servings.



Standardization of Methods. A basic baking powder biscuit recipe was selected (Fowler et al., 1967) and adapted, substituting nonfat dry milk solids and water for milk. The method for preparing baking powder biscuits was standardized to produce a quality product. This method was reviewed and approved by a panel of Institutional Management faculty.

Selection of Subject Matter. Subject matter included in the programs was based on information from food preparation textbooks by Terrell (1971), West et al. (1967), Peckham (1964), Kotschevar (1966), and Justin et al. (1956). The material was reviewed and divided into the following categories: (1) preparation of biscuit dough, (2) shaping of biscuits, (3) baking of biscuits, (4) role of ingredients, (5) standards of quality, and (6) causes for deviation.

Program A. A self-instruction program based on the task-unit concept for training employees was developed. Related Technical Information (R.T.I.) sheets developed by Welch (1962) were reviewed and adapted for this study (Appendix A). An additional column with the principle involved in each step was added to make the program appropriate for college level instruction. The "How to do it" column was supplemented with a 3-1/2 x 5 in. color picture. The adapted sheets were named Detailed Process Guides.

Steps for preparing baking powder biscuits were designated as: (1) biscuit method of mixing, (2) kneading biscuit dough, (3) rolling biscuit dough, (4) cutting biscuits, (5) panning biscuits, (6) incorporating scraps of dough, and (7) baking biscuits. A Detailed Process Guide was developed for each step and numbered consecutively. The guides were kept simple and to a minimum. Pictures of important and difficult procedures were taken and added to the "How to do it" column. The Detailed Process Guide number was



added to the recipe in a special column (Appendix B). The Detailed Process Guides (Appendix B) were reviewed and approved by a panel of Institutional Management faculty.

Program B. The script and a drawing of each slide for program B were placed on individual half sheets of paper. The pictures used in program A were duplicated as color slides for program B. Additional slides for this program were made from posters of 16 x 20 in. colored matboard with black, pre-gummed letters. The script, including the same information as the Detailed Process Guides, was written in a short, concise manner and tape recorded. Program B (Appendix C) was reviewed and approved by a panel of Institutional Management faculty. A workbook was designed to include objective review questions of the information presented in the program. At convenient locations throughout the program, the student was instructed to turn off the slide projector and tape recorder and answer review questions. After turning the projector and recorder on, the correct answers then were given to the student on the tape and a slide. These workbooks were kept by the students for future reference.

Additional Information. Additional sheets including the role of ingredients, standards of quality, and causes for deviation (Appendix B) were developed to supplement both programs.

### Evaluation Instruments

A test (Appendix A) composed of objective questions covering the information included in both programs was constructed. This test was utilized as a pre- and post-test to determine student gain in knowledge.

To evaluate products prepared by the students, a score sheet (Appendix A)

was developed. The score sheet was designed to rate external characteristics of shape, size, color, and crust and internal characteristics of color, grain, tenderness, and flavor on a five point hedonic scale. This scale ranged from 5--very desirable to 1--very undesirable.

An open-ended questionnaire (Appendix A) was composed to record student reactions and evaluations of the program studied.

### Selection of Subjects

Sophomore college students, enrolled in Home Economics majors, were selected as subjects. The students selected lacked experience in quantity food preparation and had a limited foods background. Thirteen students submitted a background questionnaire (Appendix A) and were interviewed to determine interest in the study. Eleven students were selected to participate.

### Investigation

An investigation was conducted to compare the effectiveness of both self-instruction programs. The preparation of baking powder biscuits was presented in a slide and tape program and with the use of Detailed Process Guides.

Instruction. Students were divided into two groups according to their declared major. Group A was composed of Dietetics and Institutional Management majors and received their instruction from Detailed Process Guides (Program A). The students in group B were other Home Economics majors and received their instruction from the slide and tape program (Program B). All students were scheduled for two laboratory periods.

Equipment demonstration laboratory. All students were given an equipment manual to study and were shown how to use the equipment necessary for the preparation of biscuits. Students also were shown how to record study time and the location of the programs. The Detailed Process Guides were kept in the reading room of the Department of Institutional Management and the slide and tape program in a carrell in the study room of the Department of Institutional Management. The students in Group B were instructed, by demonstration, in the operation of a Coxco/municator tape recorder and a Kodak carousel slide projector. Slides were automatically advanced by a pulse from the tape recorder. At the end of the demonstration, students were given the pre-test (Appendix A). Before leaving, after the pre-test, each student was given a packet containing the recipe, role of ingredients, standards of quality, and causes for deviation. Each student was instructed to study the packet and the program as she desired and to return in a week to prepare the product.

Preparation and evaluation laboratory. One week after the equipment laboratory, each student returned to prepare the biscuits. The Detailed Process Guides were available in the laboratory for Group A reference. While the biscuits were baking, each student completed the post-test (Appendix A) and an evaluation form (Appendix A). When the biscuits had cooled after baking, they were evaluated by the student and the investigator using the score sheet (Appendix A). All study time, at home and on the program, was recorded and the students were paid for participating in the study.

### Statistical Analysis

Data were analyzed statistically by the Kansas State University Statistical Laboratory to determine the relationship between the differences in

gain and total study time of both groups. The Wilcoxon-Mann-Whitney nonparametric test was used to determine these relationships.

## RESULTS AND DISCUSSION

Effectiveness of the two teaching programs was judged by gain in individual student scores, student study time, product evaluation, and student reaction to the programs. Individual gain was the difference between pre- and post-test scores. The pre-test was given before individualized program study and the post-test was administered after one week of study and successful preparation of biscuits.

Students were divided into two groups. Six Institutional Management majors studied the *Detailed Process Guides*, or Program A. Program B, consisting of slides plus taped instruction, was studied by five students in other Home Economics curriculums. All results are based on 11 students who completed the entire program.

### Pre-test and Post-test Scores

Student pre-test scores, as seen in Table 2, ranged from 17 to 33 in Program A and from 15 to 29 in Program B. The highest score possible was 39. Students in both groups had comparable food preparation backgrounds and many remarked about the difficulty of the test.

Scores for the post-test, which was identical to the pre-test, also are included in Table 2. Post-test scores in Program A, ranging from 26 to 37, and in Program B, ranging from 27 to 38, were higher than pre-test scores.

Table 2. Test scores.

| Student<br>No. | Program A <sup>1</sup> |           |                   | Student<br>No. | Program B <sup>2</sup> |           |                   | Gain <sup>3</sup> |
|----------------|------------------------|-----------|-------------------|----------------|------------------------|-----------|-------------------|-------------------|
|                | Pre-test               | Post-test | Gain <sup>3</sup> |                | Pre-test               | Post-test | Gain <sup>3</sup> |                   |
| 1              | 17                     | 31        | 14                | 8              | 20                     | 33        | 13                |                   |
| 6              | 27                     | 36        | 9                 | 11             | 25                     | 38        | 13                |                   |
| 2              | 29                     | 36        | 7                 | 7              | 15                     | 27        | 12                |                   |
| 3              | 31                     | 35        | 4                 | 9              | 20                     | 30        | 10                |                   |
| 4              | 22                     | 26        | 4                 | 10             | 29                     | 34        | 5                 |                   |
| 5              | 33                     | 37        | 4                 |                |                        |           |                   |                   |

<sup>1</sup>Program A--Detailed Process Guides

<sup>2</sup>Program B--Slide and tape

<sup>3</sup>Gain in scores was not significant between programs.

### Gain in Test Scores

Students in both programs gained in scores as a result of studying the individualized instructions. The gain (Table 2) ranged from 4 to 14 for Program A and from 5 to 13 for Program B. There was no significant difference in the gain scores between the two programs according to the Wilcoxon-Mann-Whitney test.

### Study Time

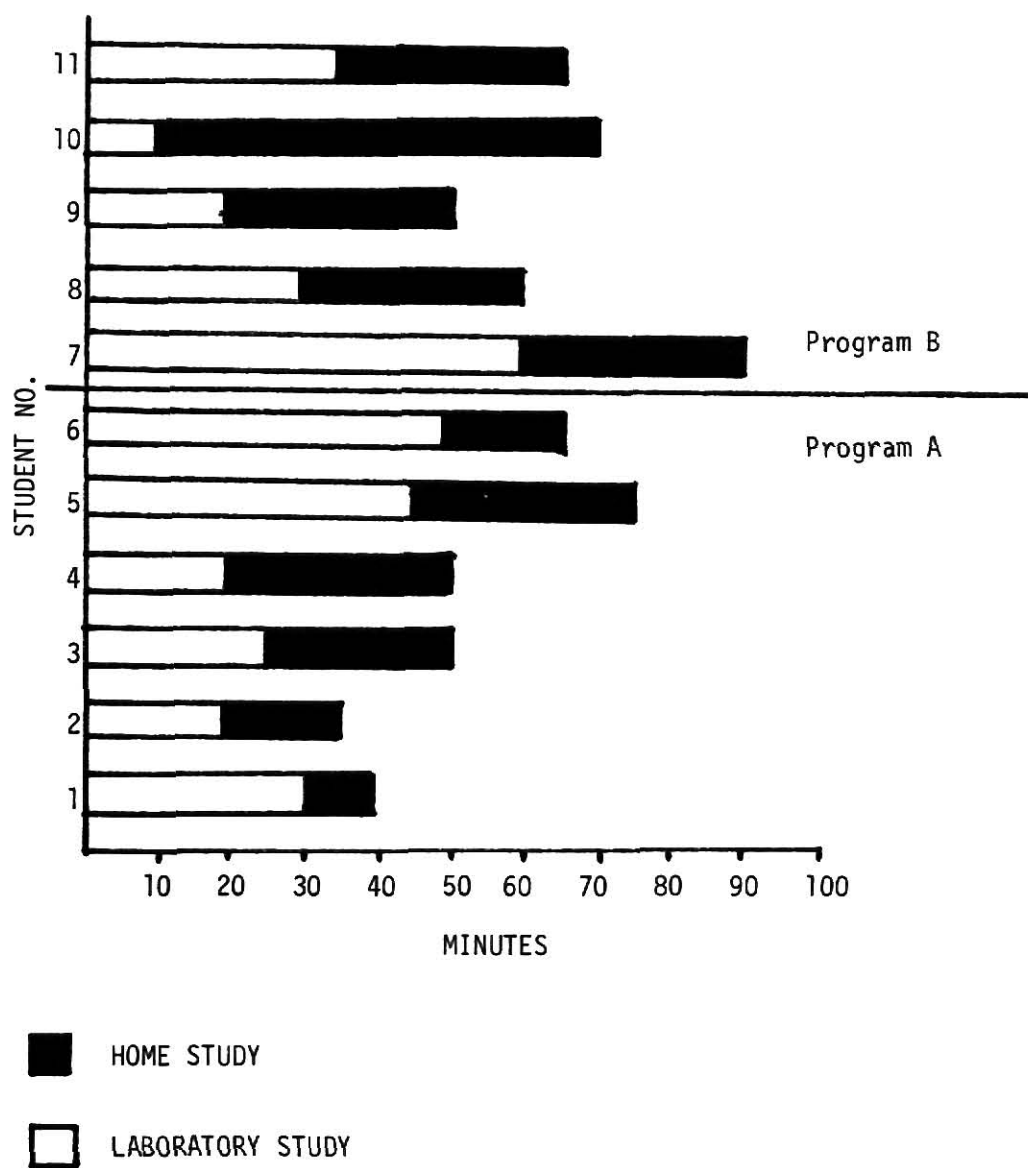
Student study time (Fig. 1) was divided into laboratory study and home study. Laboratory study time was the number of minutes spent reviewing the instruction programs as recorded by students. Home study time was the number of minutes reported by the student as time required for studying additional information sheets for both programs and the workbooks for Program B. Laboratory time required to study the Detailed Process Guides (Program A) ranged from 20 to 50 minutes. Laboratory study time for the slide and tape program (Program B) ranged from 10 to 60 minutes. Home study time for Program A ranged from 10 to 30 minutes, while home study was greater for Program B, ranging from 30 to 60 minutes. Total study time, the sum of laboratory and home study, ranged from 35 to 75 minutes for Program A. Total study time for Program B ranged from 50 to 90 minutes. There was no significant difference in total study times between programs.

### Product Evaluation

After a lapse of one week for self-instruction, each student prepared 50 portions of baking powder biscuits in the Institutional Management laboratory. Biscuits were evaluated by the investigator and student using a score

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Program A -- Detailed Process Guides  
Program B -- Slide and tape program

Fig. 1. Individual study time.



sheet (Appendix A). Scores for the eight characteristics were averaged to obtain an overall product score that ranged from 4.1 to 4.9 (Table 3). Detailed scores are included in Appendix E.

Overall product score is compared to the total study time for each student in Table 3. Students in Program B had the highest and lowest product scores. The student with the longest study time (90 min.) had the lowest product score (4.1). There does not appear to be a consistent relationship between the overall product score and total study time for the students in this investigation.

#### Student Reactions

Student reactions were recorded on an open-end questionnaire (Appendix A). Students in both groups stated that the programs were simple, clear, and easy to understand. The terms used were clearly stated, defined, or illustrated. Procedures for both programs were reported as being short and precise.

Program A. Students apparently liked having pictures and all relevant information included with the instructions in the Detailed Process Guides. Several students indicated that if difficult and complex recipes were used, the large number of Detailed Process Guides could become confusing, cumbersome, and monotonous. Others thought that these guides would be helpful in making other quick breads. One student stated that she learned more about basic principles than from conventional instructions. Students pointed out that studying this program saved time but required self motivation.

Program B. Students studying the slide and tape program believed that this method of instruction allowed them to learn only what was necessary on

Table 3. Overall product scores and total study time.

| Program A   |                                    |                       | : | Program B   |                                    |                       |
|-------------|------------------------------------|-----------------------|---|-------------|------------------------------------|-----------------------|
| Student No. | Overall Product Score <sup>1</sup> | Total Study Time Min. | : | Student No. | Overall Product Score <sup>1</sup> | Total Study Time Min. |
| 5           | 4.8                                | 75                    | : | 10          | 4.9                                | 70                    |
| 3           | 4.7                                | 50                    | : | 11          | 4.7                                | 65                    |
| 4           | 4.5                                | 50                    | : | 9           | 4.5                                | 50                    |
| 1           | 4.5                                | 40                    | : | 8           | 4.2                                | 60                    |
| 6           | 4.4                                | 65                    | : | 7           | 4.1                                | 90                    |
| 2           | 4.4                                | 35                    | : |             |                                    |                       |

<sup>1</sup>Averages of eight characteristics based on a 5-point Hedonic scale:

- 5 Very desirable
- 4 Desirable
- 3 Acceptable
- 2 Undesirable
- 1 Very undesirable

their own. They considered it advantageous to see and hear instructions, but commented that reading the instructions would aid in comprehension. One student was concerned that interest could be lost easily with this method of instruction; another thought the tape recorded instructions were given too fast. Others commented that the instructions presented were at a maximum and may be more than were needed.

### SUMMARY

Increased demand for professional food service personnel is forcing educators to examine and evaluate new methods of instruction. To effectively utilize student and teacher time, new methods of self-instruction are being adapted. Basic to most curriculums in food service management is a course in quantity food preparation, which generally is an application of basic principles to quantity food preparation. Students may have various backgrounds and interests in the food service industry. Self-instruction programs are being considered as one approach to effective use of class time and to level student background differences.

The purpose of this study was to develop two self-instruction programs for a college-level quantity food preparation course and to compare their effectiveness.

The Task-unit concept for training employees was adapted to instruct college-level students in the preparation of baking powder biscuits. This concept included instructional sheets containing columns for "what to do" and "how to do it" for each procedure. Principles involved in each step and illustrations were included. The sheets were re-named Detailed Process Guides. Using the same method of preparing biscuits, a slide and tape program was produced.

The effectiveness of the programs was tested with 11 college sophomores registered in Home Economics curriculums. Students were divided into two groups according to declared majors. Six Dietetics and Institutional Management majors studied Program A, Detailed Process Guides. Five other Home Economics majors studied Program B, a slide and tape program.

Students answered written objective pre- and post-tests. After one week of study, students prepared and evaluated the product. All study time connected with the program was recorded.

Student gain in test scores was not significantly different between programs. No significant difference was found in the amount of study time spent on each program.

#### CONCLUSIONS AND RECOMMENDATIONS

Detailed Process Guides and a slide and tape program were equally effective in teaching students preparation of a simple product in quantity. Gain in test scores and student reactions indicated that either of these methods of individualized instruction may be used to augment laboratory preparation in quantity foods courses. Both programs saved student study time and have the potential for increased use.

Both programs have advantages. Detailed Process Guides contain pertinent information in columnar form and may be placed in the laboratory for student reference. The slide and tape program allows the instructor to talk to the student using voice intonations to stress important information. This program requires equipment that adds to the cost of instruction.

Further study using both programs with more complicated recipes is recommended. The slide and tape program could be supplemented with an

outline of the information presented to facilitate student note-taking. The questions interspersed throughout the program and workbooks may be deleted with the addition of an outline. Additional investigation in a classroom-laboratory situation to compare effectiveness of self-instruction programs with conventional teaching techniques is indicated.

## ACKNOWLEDGMENTS

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## APPENDIX A

| WHAT TO DO | HOW TO DO IT | PRINCIPLE INVOLVED |
|------------|--------------|--------------------|
|------------|--------------|--------------------|

TITLE: \_\_\_\_\_

D.P.G. \_\_\_\_\_

**THIS BOOK  
CONTAINS  
NUMEROUS PAGES  
WITH MULTIPLE  
PENCIL AND/OR  
PEN MARKS  
THROUGHOUT THE  
TEXT.**

**THIS IS THE BEST  
IMAGE AVAILABLE.**

## PRE- AND POST-TEST

NAME \_\_\_\_\_

DATE \_\_\_\_\_

## BAKING POWDER BISCUITS

1. Place the number of the role from column B in front of the correct baking powder biscuit ingredient in column A.

| A                      | B                              |
|------------------------|--------------------------------|
| _____ Sugar            | 1. Structure                   |
| <u>4</u> Salt          | 2. Nutritive Value             |
| _____ Baking soda      | 3. Leavening                   |
| <u>7,4,2</u> Milk      | 4. Flavor                      |
| <u>3</u> Baking powder | 5. Tenderness                  |
| <u>4,5,6</u> Fat       | 6. Flakiness                   |
| <u>1,2</u> Flour       | 7. Hydration of flour proteins |
| _____ Cornstarch       |                                |

2. Number in order, the steps in the biscuit method of mixing ingredients

- 3 A. Add milk  
2 B. Cut in fat  
 \_\_\_\_\_ C. Melt fat  
1 D. Combine dry ingredients  
4 E. Knead

3. In the biscuit method of combining ingredients, dry milk is

- A. Reconstituted before adding to ingredients.  
 B. Added to dry ingredients with the fat.  
C. Added to dry ingredients.  
 D. Not used in making biscuits.

4. In the biscuit method of combining ingredients, fat is
- A. Melted before added.
  - ☒ B. Mixed with dry ingredients.
  - C. Heated with milk before adding.
  - D. Added with milk.
5. Dough is kneaded
- ☒ A. To develop gluten.
  - B. To distribute ingredients.
  - ☒ C. To develop layers.
  - D. To allow dough to ferment.
6. Baking powder biscuit dough will
- A. Triple in height during baking.
  - B. Decrease in volume during baking.
  - C. Not rise during baking.
  - ☒ D. Double in height during baking.
7. When cutting biscuits
- ☒ A. Place the cutter close to the edges of the dough.
  - B. Turn cutter as you press the dough.
  - C. Use an unfloured cutter.
  - ☒ D. Press cutter with an even force.
8. Tough biscuits may be caused by
- A. Too much liquid.
  - ☒ B. Too much kneading.
  - C. Too much fat.
  - ☒ D. Too much flour.

9. Circle the correct placement on a pan for baking powder biscuits

- ☒ A. 1/2 inch apart.
- B. 3/4 inch apart.
- ☒ C. Sides touching.
- D. 1/4 inch apart.

10. Circle the characteristics of a quality biscuit from the list below

- A. Dark brown top.
- ☒ B. Golden brown top.
- ☒ C. Flaky interior.
- D. Mealy interior.

11. Match the cause for deviation in column B with the correct deviation in column A

| A                         | B                             |
|---------------------------|-------------------------------|
| <u>5,2,9</u> Tough        | 1. High proportion of fat.    |
| <u>6,7</u> Pale crust     | 2. Improper mixing.           |
| <u>8</u> Uneven shape     | 3. Too high oven temperature. |
| <u>2,3</u> Flat and heavy | 4. Too long baking time.      |
| <u>4</u> Dry crumb        | 5. Lack of fat.               |
| <u>1</u> Crumbly and oily | 6. Too slow oven.             |
| <u>4,3</u> Hard crust     | 7. Flour on surface.          |
|                           | 8. Uneven heat.               |
|                           | 9. Improper kneading.         |

# **ILLEGIBLE DOCUMENT**

**THE FOLLOWING  
DOCUMENT(S) IS OF  
POOR LEGIBILITY IN  
THE ORIGINAL**

**THIS IS THE BEST  
COPY AVAILABLE**



## SCORE SHEET FOR BISCUITS

NAME \_\_\_\_\_ DATE \_\_\_\_\_

| FACTOR | SCORE | COMMENTS |
|--------|-------|----------|
|--------|-------|----------|

## EXTERNAL CHARACTERISTICS

SHAPE. Uniform, straight  
sides and level top.

SIZE. Uniform.

COLOR. Uniform golden brown  
tops and bottoms, sides  
lighter, free from  
yellow or brown spots.

CRUST. Tender, moderately smooth,  
free from excess flour.

## INTERNAL CHARACTERISTICS

COLOR. Creamy white, free from  
yellow or brown spots.

GRAIN. Flaky, pulling off in  
thin sheets, medium fine,  
even cells.

TENDERNESS. Slightly moist, light.

FLAVOR. Pleasing, well-blended  
with no bitterness.

SCORING KEY:

|   |                  |
|---|------------------|
| 5 | Very desirable   |
| 4 | Desirable        |
| 3 | Acceptable       |
| 2 | Undesirable      |
| 1 | Very undesirable |

## EVALUATION OF SELF INSTRUCTION METHOD

1. Did you understand the language used?
2. Were the procedures clearly stated?
3. Are the instructions in the program detailed enough?
4. Did you find this method of instruction of value? Why or why not?

## STUDENT FACT SHEET

1. NAME \_\_\_\_\_ 2. MANHATTAN ADDRESS \_\_\_\_\_

3. AGE \_\_\_\_\_ PHONE \_\_\_\_\_ 4. MAJOR \_\_\_\_\_ CLASS \_\_\_\_\_

5. PREVIOUS FOOD PREPARATION COURSES (INCLUDING HIGH SCHOOL).

6. ALL PREVIOUS WORK EXPERIENCE.

7. CLASS SCHEDULE.

| Name.....     |         | Social Security Number..... |         |
|---------------|---------|-----------------------------|---------|
| Line No.      | Subject | Room                        | Cr. Hr. |
| A             |         |                             |         |
| B             |         |                             |         |
| C             |         |                             |         |
| D             |         |                             |         |
| E             |         |                             |         |
| F             |         |                             |         |
| G             |         |                             |         |
| H             |         |                             |         |
| I             |         |                             |         |
| J             |         |                             |         |
| K             |         |                             |         |
| L             |         |                             |         |
| M             |         |                             |         |
| TOTAL CREDITS |         |                             |         |

| Hour   | 7:30 | 8:30 | 9:30 | 10:30 | 11:30 | 12:30 | 1:30 | 2:30 | 3:30 | 4:30 |
|--------|------|------|------|-------|-------|-------|------|------|------|------|
| Summer |      |      |      |       |       |       |      |      |      |      |
| Fall   |      |      |      |       |       |       |      |      |      |      |
| Spring |      |      |      |       |       |       |      |      |      |      |
| MON.   |      |      |      |       |       |       |      |      |      |      |
| TUES.  |      |      |      |       |       |       |      |      |      |      |
| WED.   |      |      |      |       |       |       |      |      |      |      |
| THUR.  |      |      |      |       |       |       |      |      |      |      |
| FRI.   |      |      |      |       |       |       |      |      |      |      |
| SAT.   |      |      |      |       |       |       |      |      |      |      |

USE THIS PROOF TICKET TO AVOID CONFLICTS

Signed..... (Assigner)

SEMESTER..... COLLEGE.....

## APPENDIX B

## PROGRAM A

### INSTRUCTIONS FOR USE OF DETAILED PROCESS GUIDES

1. Obtain guides from reading room and fill out check-out sheet.
2. Take program to study carrells in JU 118.
3. Study program.
4. Return program to reading room and fill out check-out sheet.

# RECIPE USED FOR PROGRAM A

BAKE: 15 min.  
OVEN: 425°F.

YIELD: 100 biscuits

| AMOUNT      | INGREDIENT       | METHOD  | D.P.G.                    |
|-------------|------------------|---|---------------------------|
| 5 lb.       | Flour            |   |                           |
| 5 oz.       | Baking powder    | Place dry ingredients in a mixer bowl.  |                           |
| 2 oz.       | Salt             | Mix (low speed) 1 min.  | 1                         |
| 6-1/2 oz.   | Non-fat dry milk |   |                           |
| 1 lb. 4 oz. | Fat              | Add fat.<br>Mix (low speed) 3 min.  | 1                         |
| 1-3/4 qt.   | Water            | Add water.<br>Mix (low speed) 1 min.<br>Place 1/3 of dough on floured board and knead lightly.<br>Roll to 3/4 in. thickness and cut with 2 in. cutter.<br>Place on baking sheet.<br>Bake. | 1<br>2,6<br>3,4<br>5<br>7 |

# DETAILED PROCESS GUIDES

| WHAT TO DO               | HOW TO DO IT   | PRINCIPLE INVOLVED   |
|--------------------------|--|--|
| Combine dry ingredients. | <p>Weigh or measure dry ingredients into a mixer bowl.</p> <p>Mix with flat paddle at low speed.</p> | All dry ingredients, including dry milk, are evenly distributed by mixing.   |
| Add fat.                 | Combine fat with dry ingredients (low speed) until it is the consistency of coarse cornmeal.         | Fat is distributed throughout the dough to produce tenderness and flakiness.   |
| Add milk.                | Add milk all at once. If dry milk is used, the correct proportion of water is added.                 | Liquid hydrates the protein which is part of the process of developing gluten.   |
| Mix dough.               | Mix (low speed) until dough adheres together.  | Dough is mixed until all ingredients are moistened. Dough should be soft, but not sticky. Overmixing overdevelops gluten and results in a tough product. |

TITLE: Biscuit Method of Mixing

D.P.G. 1

| WHAT TO DO                  | HOW TO DO IT   | PRINCIPLE INVOLVED   |
|-----------------------------|--|--|
| Remove 1/3 dough from bowl. | With rubber spatula, remove 1/3 dough onto a lightly floured surface.  | Dough is divided into smaller portions for ease of handling.   |
| Lightly hand knead dough.   | Form dough into a ball on lightly floured surface. Grasp dough at the far edge, raise it, and fold towards the front, pressing down lightly with palm of hand. Do not compress the dough. Turn dough one quarter turn. Repeat folding process 10-12 times. | Dough is lightly hand kneaded, rather than mechanically, to protect against overkneading. Dough should be kneaded until it is smooth. Overkneading produces a tough product. Dough is kneaded to combine ingredients, to develop gluten, and to form layers. |

TITLE: Kneading Biscuit Dough

D.P.G. 2



**THIS BOOK  
CONTAINS SEVERAL  
DOCUMENTS THAT  
ARE OF POOR  
QUALITY DUE TO  
BEING A  
PHOTOCOPY OF A  
PHOTO.**

**THIS IS AS RECEIVED  
FROM CUSTOMER.**

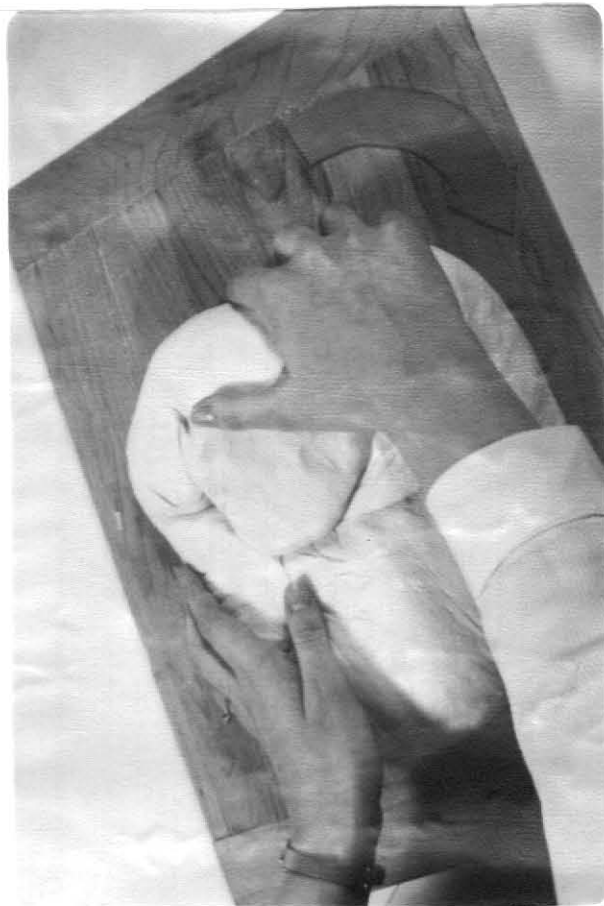
**THIS BOOK  
CONTAINS  
NUMEROUS PAGES  
WITH PICTURES  
THAT ARE CROOKED  
COMPARED TO THE  
REST OF THE  
INFORMATION ON  
THE PAGE.**

**THIS IS AS RECEIVED  
FROM CUSTOMER.**

WHAT TO DO

HOW TO DO IT

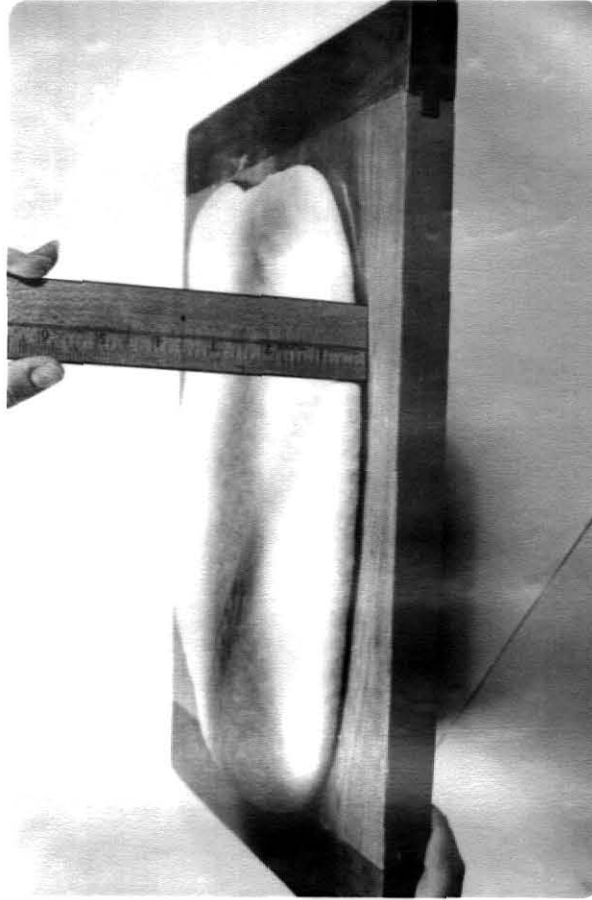
PRINCIPLE INVOLVED



TITLE: Kneading Biscuit Dough (Continued)

D.P.G. 2

| WHAT TO DO  | HOW TO DO IT  | PRINCIPLE INVOLVED   |
|-------------|---|--|
| Roll dough. | Using a lightly floured rolling pin, roll dough gently from center to outside of dough until an even thickness of 3/4 in. is reached. | Dough is rolled to make a smooth surface and an even thickness. Dough is rolled to 1/2 the desired thickness of the baked biscuit. |



TITLE: Rolling Biscuit Dough

D.P.G. 3

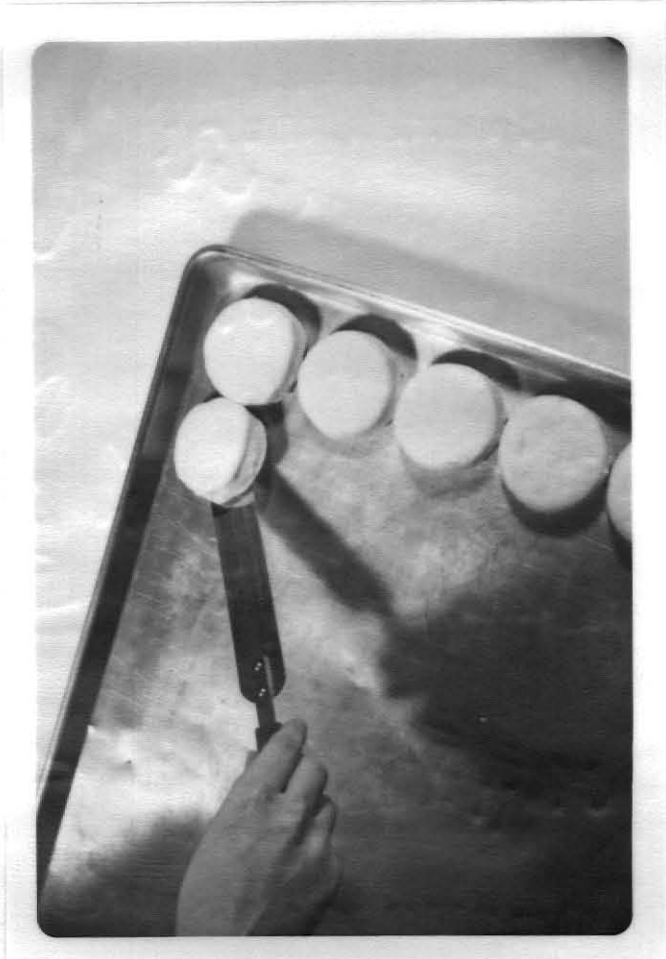
| WHAT TO DO    | HOW TO DO IT   | PRINCIPLE INVOLVED   |
|---------------|--|--|
| Cut biscuits. | <p>While holding handle, dip 2 in. cutter into flour.</p> <p>Place cutter on dough, close to edges.</p> <p>Press cutter with an even force. Repeat, placing cutter close to edges.</p> | <p>Cutter is lightly floured to prevent sticking.</p> <p>Uneven pressing of the cutter produces a biscuit with uneven sides and top.</p> <p>Place cutter close to edges to reduce the number of reworked biscuits.</p> |



TITLE: Cutting Biscuits

D.P.G. 4

| WHAT TO DO                                | HOW TO DO IT   | PRINCIPLE INVOLVED   |
|---|--|--|
| Place biscuits on ungreased baking sheet. | Using a metal spatula, place biscuits 1/2 in. apart on pan.                | Biscuits will have brown, crisp sides if placed apart on pan.            |
|   | For biscuits with softer sides, place biscuits on pan with sides touching. | Biscuits will have softer, more tender sides, if placed together on pan. |



TITLE: Panning Biscuits

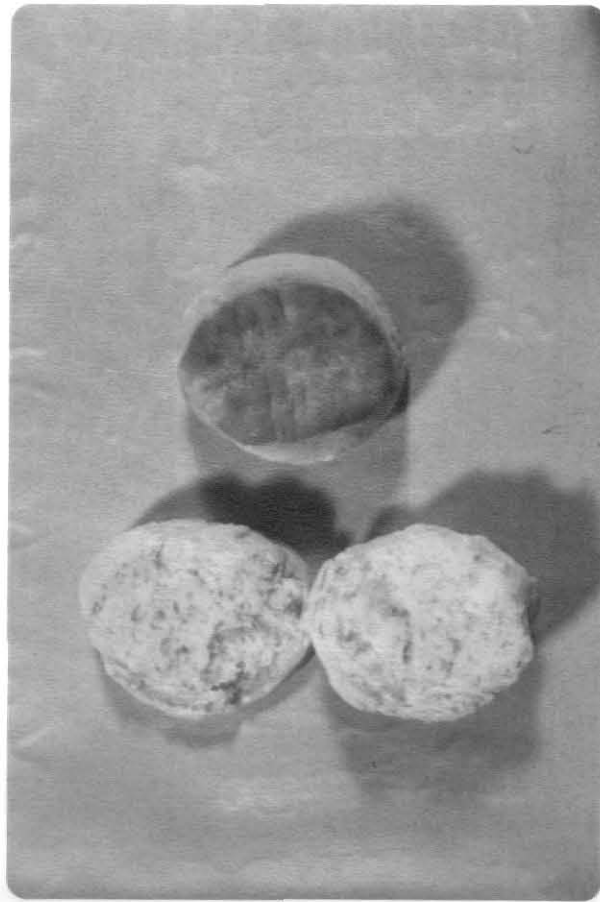
D.P.G. 5

| WHAT TO DO                        | HOW TO DO IT  | PRINCIPLE INVOLVED  |
|-----------------------------------|---|---|
| Add scraps to next dough portion. | Place scraps on floured surface and combine with next portion while kneading. | Dough scraps are combined with dough portions to produce a maximum yield.<br>Too much flour worked into the dough will make biscuits tough and dry.<br>Overkneading produces a tough product. |

TITLE: Incorporating Scraps of Dough

D.P.G. 6

| WHAT TO DO                   | HOW TO DO IT   | PRINCIPLE INVOLVED   |
|------------------------------|--|--|
| Set oven.                    | Set oven to required temperature 30 min. before baking.                    | Preheating the oven assures the desired temperature when required.   |
| Bake biscuits.               | Place panned biscuits in oven.   | Baking releases CO <sub>2</sub> gas which increases biscuit volume, the heat coagulates the gluten and sets the biscuit structure. |
| Check biscuits for doneness. | At end of minimum baking time, check color of biscuits and break one open. | Biscuits are done when they have an even, golden brown crust and a flaky interior.   |



TITLE: Baking Biscuits

D.P.G. 7



ROLE OF INGREDIENTS  
BAKING POWDER BISCUITS<sup>1</sup>

|               |   |
|---------------|---|
| FLOUR         | Structure, nutritive value                              |
| BAKING POWDER | Leavening   |
| SALT          | Flavor  |
| FAT           | Tenderness, flakiness, flavor                           |
| MILK          | Hydration of flour proteins, flavor,<br>nutritive value |

---

<sup>1</sup>Also used in Program B.

STANDARDS OF QUALITY  
BAKING POWDER BISCUITS<sup>1</sup>

EXTERIOR

Golden brown, smooth, level top.

Crust crisp, tender free from excess flour.

Symmetrical in shape and uniform in size.

INTERIOR

Creamy white, free from spots.

Slightly moist.

Tender, light, and flaky.

VOLUME

Doubled in size.

---

<sup>1</sup>Also used in Program B.

# CAUSES FOR DEVIATION BAKING POWDER BISCUITS<sup>1</sup>

| DEVIATION            | CAUSE  |
|----------------------|--|
| Tough                | Lack of fat.<br>Too much mixing or kneading.                                       |
| Pale crust           | Too slow an oven.<br>Too stiff a dough.<br>Flour on surface.                       |
| Uneven shape         | Carelessness in handling.<br>Uneven heat.  |
| Uneven brown         | Uneven shape.<br>Uneven heat.  |
| Flat and heavy       | Wrong proportion of ingredients.<br>Improper mixing.<br>Too high oven temperature. |
| Coarse, porous grain | Improper mixing.   |
| Dry, harsh crumb     | Too stiff a batter.<br>Overbaked.  |
| Hard crust           | Too long baking.<br>Too high a temperature.  |
| Crumbly and oily     | Too high a proportion of fat.  |
| Off flavor           | Rancid fat.  |

---

<sup>1</sup>Also used in Program B.

## APPENDIX C

## PROGRAM B

## INSTRUCTIONS FOR USE OF SLIDE AND TAPE PROGRAM

1. Obtain key to carrell drawer from secretary.
2. Fill out check-out sheet.
3. Set up projector and recorder at study carrell in JU 118.
4. Study program, filling out student workbook as directed.
5. Rewind tape and return slide carousel to 0 position.
6. Return key to secretary and fill out check-out.

# RECIPE USED FOR PROGRAM B

## BAKING POWDER BISCUITS

BAKE: 15 min.

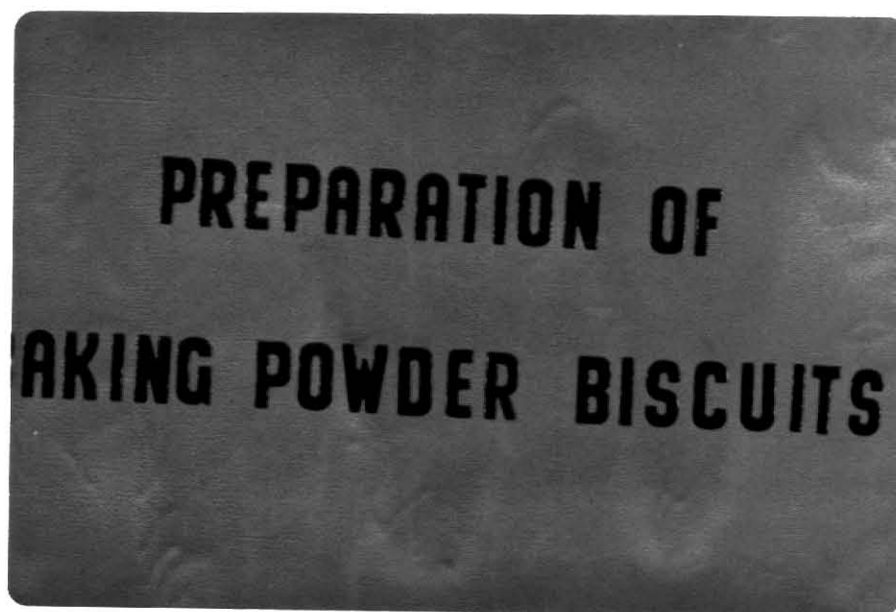
OVEN: 425°F.

YIELD: 100 biscuits

| AMOUNT      | INGREDIENT       | METHOD  |
|-------------|------------------|---|
| 5 lb.       | Flour            |   |
| 5 oz.       | Baking powder    | Place dry ingredients in a mixer bowl.  |
| 2 oz.       | Salt             | Mix (low speed) 1 min.  |
| 6-1/2 oz.   | Non-fat dry milk |   |
| 1 lb. 4 oz. | Fat              | Add fat.<br>Mix (low speed) 3 min.  |
| 1-3/4 qt.   | Water            | Add water.<br>Mix (low speed) 1 min.<br>Place 1/3 of dough on floured board and knead lightly.<br>Roll to 3/4 in. thickness and cut with 2 in. cutter.<br>Place on baking sheet.<br>Bake. |

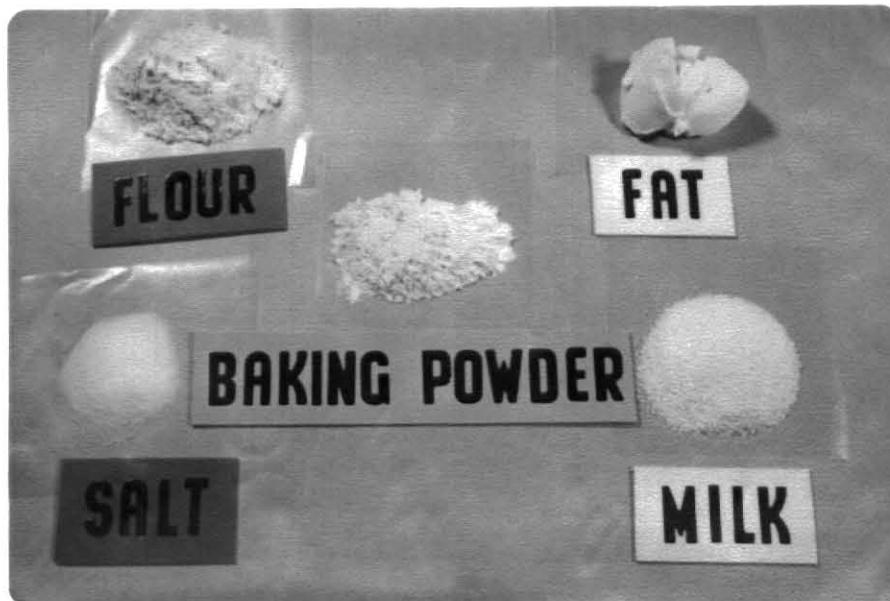
## SLIDE AND TAPE PROGRAM

Slide 1



Baking powder biscuits are made from a soft dough; that is, the dough contains 3 parts flour to 1 part liquid.

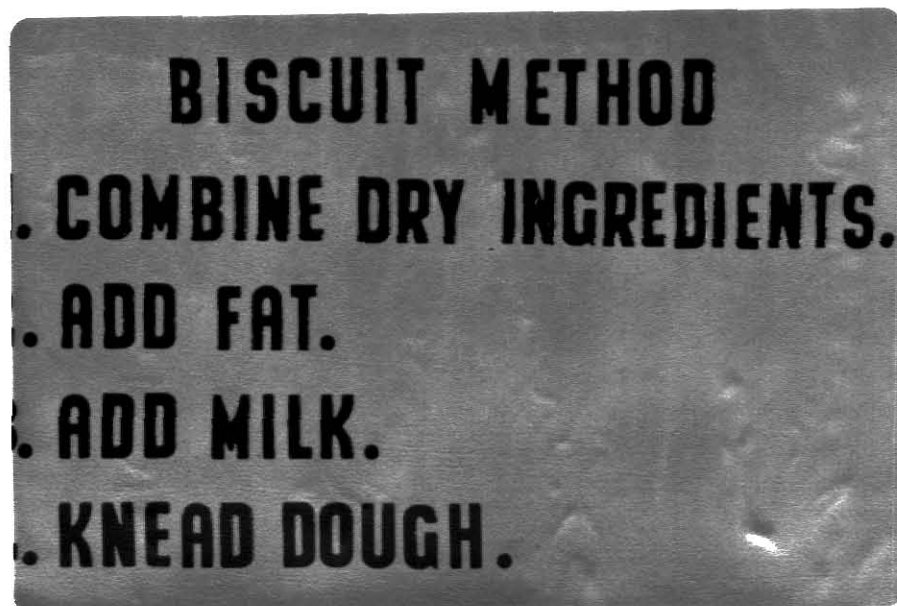
## Slide 2



The ingredients in baking powder biscuits are: Flour, for structure and nutritive value; Salt, for flavor; Baking powder, for leavening; Fat, for tenderness, flakiness, and flavor; Milk, for liquid which hydrates the flour proteins, nutritive value and flavor.

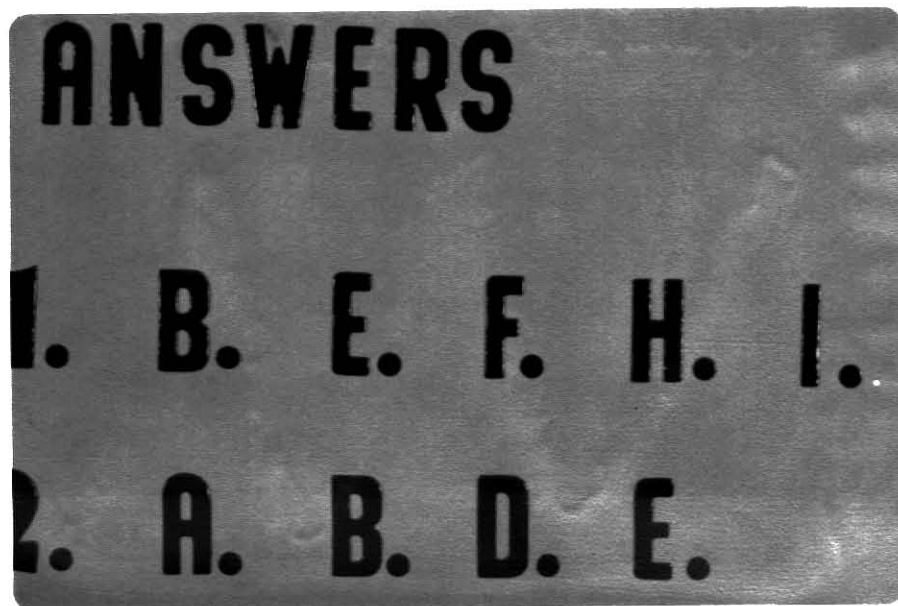


Slide 3



The method used in mixing ingredients for biscuits is called the biscuit method. Turn off the projector and recorder and answer questions 1 and 2 in your workbook.

Slide 4



The ingredients listed in question 1 that are used in baking powder biscuits are; (B.) Salt, (E.) Baking powder, (F.) Milk, (H.) Fat, (I.) Flour. You should have placed an X before letters (A.), (B.), (D.), and (E.) in question 2.

Slide 5



**COMBINE DRY INGREDIENTS.**

Dry ingredients are placed in a mixing bowl and evenly distributed by mixing with a flat paddle at low speed. Dry milk, if used, is mixed with the dry ingredients.

Slide 6



Fat is mixed with dry ingredients using a flat paddle at low speed. It is mixed until it is the consistency of cornmeal to increase tenderness and flakiness.

## Slide 7



Milk is added all at once and the ingredients are mixed at low speed with a flat paddle. The dough should be soft but not sticky. If dry milk is used, it is added with the dry ingredients and water is added at this time.

Slide 8



**4. KNEAD DOUGH LIGHTLY.**

For easier handling, 1/3 of the dough is removed from the bowl onto a lightly floured surface. Each piece of dough is formed into a ball.

## Slide 9



To knead, grasp dough at the far edge, raise it, and fold towards the **front**, pressing down lightly with palm of hand.

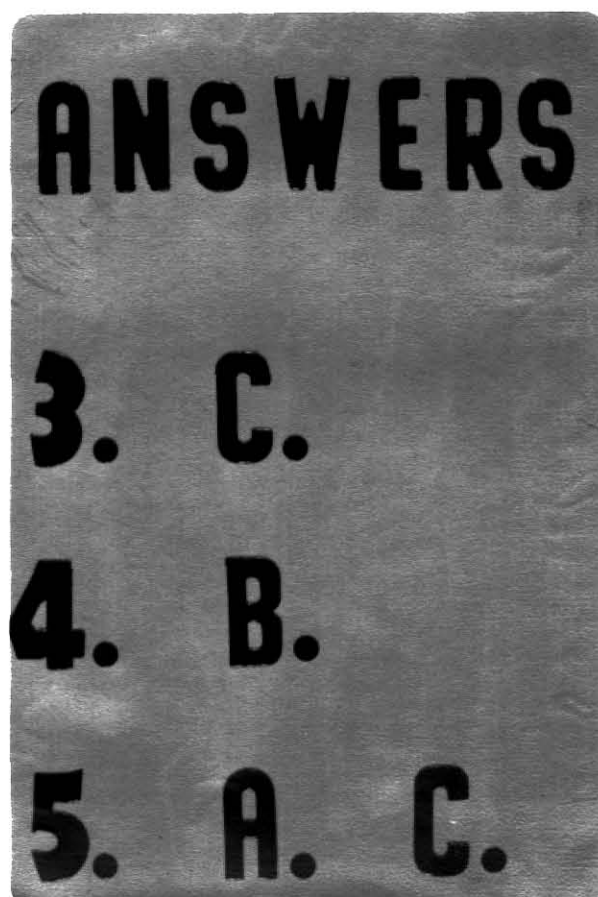
## Slide 10



Turn the dough one quarter turn and repeat 10 to 12 times or until dough is just smooth. Kneading develops gluten for structure and layers for flakiness. Turn off the projector and recorder and answer questions 3 through 5 in your workbook.

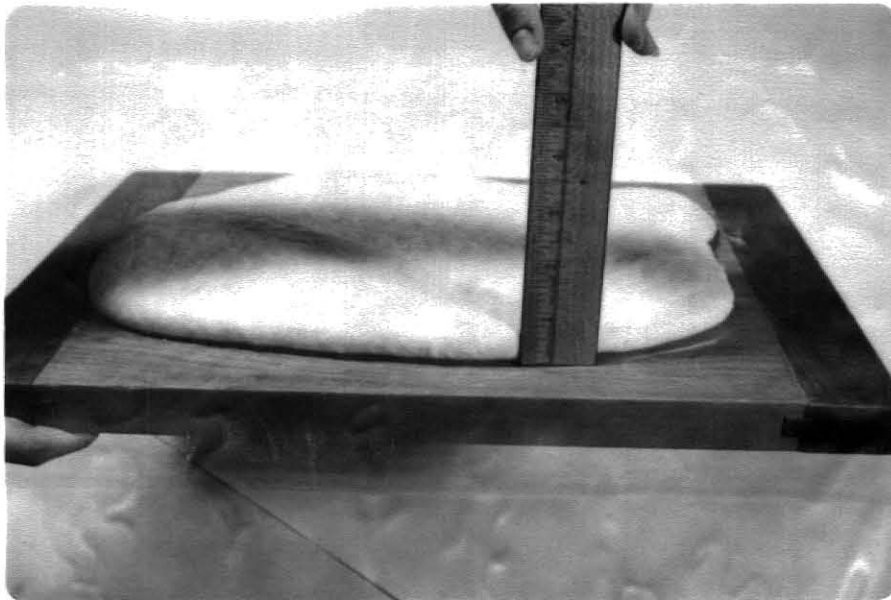


Slide 11



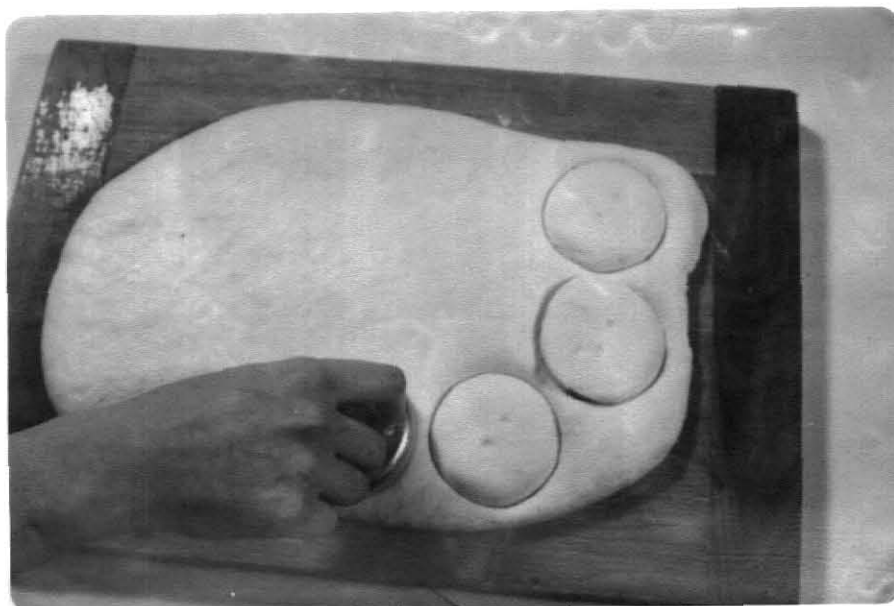
In question 3, dry milk is (C.) added to dry ingredients. In question 4, fat is (B.) mixed with dry ingredients. The correct reasons for kneading are (A.) and (C.).

## Slide 12



Using a lightly floured rolling pin, roll dough gently from center to outside of dough until an even thickness of  $\frac{3}{4}$  inch is reached. Dough is rolled to  $\frac{1}{2}$  the desired thickness of the baked biscuit.

## Slide 13



Cut biscuits by placing a lightly floured 2 inch cutter close to the edges of the dough. By pressing the cutter with an even force, the finished biscuit will have straight sides and a level top. All dough scraps should be combined with the next dough portion. This will produce a maximum yield.

## Slide 14



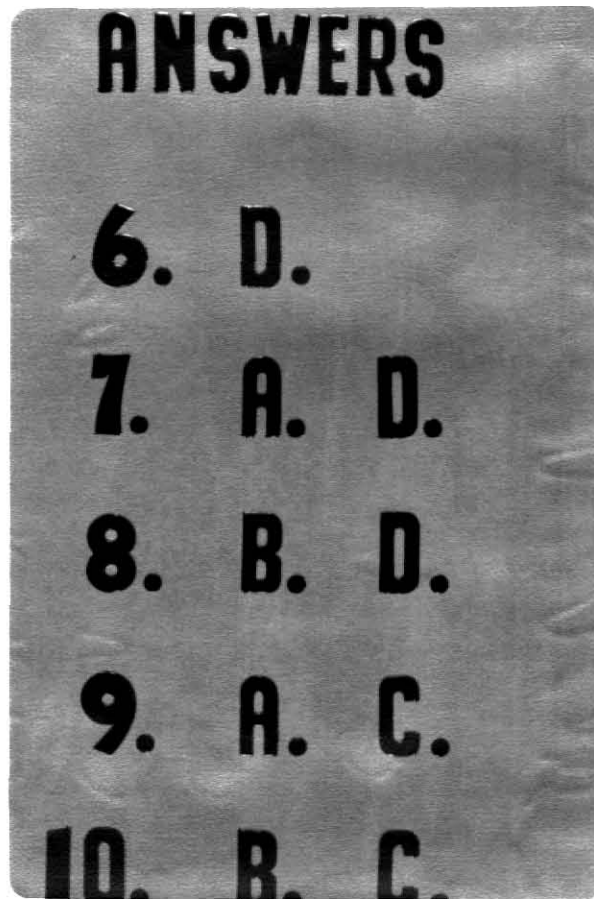
Place biscuits 1/2 inch apart on an ungreased baking sheet for biscuits with crisp sides. For biscuits with softer sides, place them with sides touching on an ungreased baking sheet.

## Slide 15



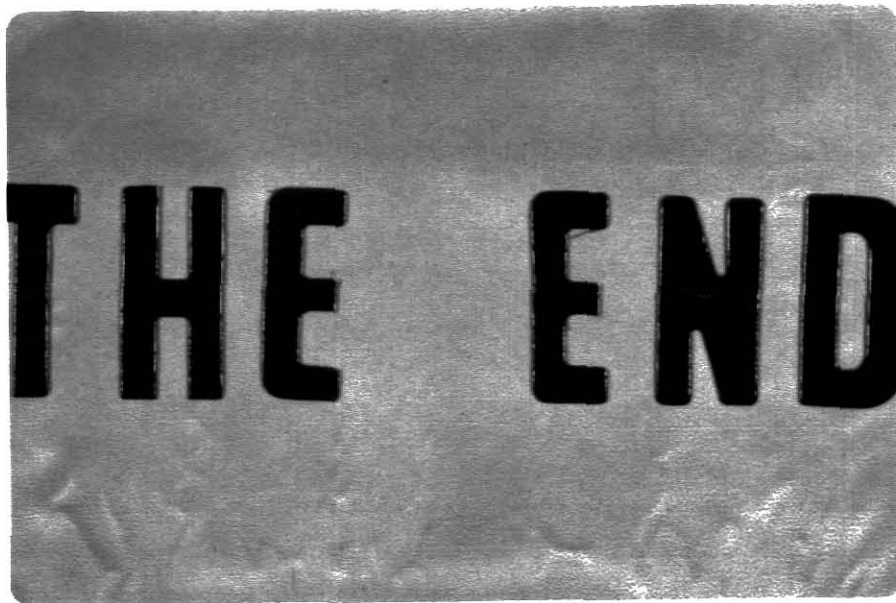
Finished biscuits have an even, golden brown crust with a tender, light, and flaky interior. You should check for doneness at the end of the minimum baking time. Turn off the projector and recorder and answer questions 6 through 10 in your workbook.

Slide 16



In question 6, baking powder biscuits (D.) double in height during baking. The correct methods of cutting biscuits in question 7 are (A.) and (D.). In question 8, tough biscuits are caused by (B.) too much kneading and (D.) too much flour. The correct placements of biscuits are (A.) 1/2 inch apart for crusty biscuits and (C.) sides touching for biscuits with softer edges. In question 10, the characteristics of quality biscuits are (B.) golden brown top and (C.) flaky interior.

Slide 17



This is the end of instruction in the preparation of baking powder biscuits. Turn off the projector and the recorder.

## STUDENT WORKBOOK

## BAKING POWDER BISCUITS

1. From the list below, circle the letter of the ingredients used in baking powder biscuits.

|                  |               |
|------------------|---------------|
| A. Sugar         | F. Milk       |
| B. Salt          | G. Sour milk  |
| C. Eggs          | H. Fat        |
| D. Baking soda   | I. Flour      |
| E. Baking powder | J. Cornstarch |

2. Place an X before the steps in the biscuit method of mixing ingredients.

\_\_\_\_\_ A. Add milk

\_\_\_\_\_ B. Cut in fat

\_\_\_\_\_ C. Melt fat

\_\_\_\_\_ D. Combine dry ingredients

\_\_\_\_\_ E. Knead

TURN ON PROJECTOR AND RECORDER.



3. In the biscuit method of combining ingredients, dry milk is
  - A. Reconstituted before adding to ingredients.
  - B. Added to dry ingredients with the fat.
  - C. Added to dry ingredients.
  - D. Not used in making biscuits.
4. In the biscuit method of combining ingredients, fat is
  - A. Melted before added.
  - B. Mixed with dry ingredients.
  - C. Heated with milk before adding.
  - D. Added with milk.
5. Dough is kneaded
  - A. To develop gluten.
  - B. To distribute ingredients.
  - C. To develop layers.
  - D. To allow dough to ferment.

TURN ON PROJECTOR AND RECORDER.

6. Baking powder biscuit dough will
  - A. Triple in height during baking.
  - B. Not rise during baking.
  - C. Decrease in volume during baking.
  - D. Double in height during baking.
7. When cutting biscuits
  - A. Place the cutter close to the edges of the dough.
  - B. Turn cutter as you press the dough.
  - C. Use an unfloured cutter.
  - D. Press cutter with an even force.
8. Tough biscuits may be caused by
  - A. Too much liquid.
  - B. Too much kneading.
  - C. Too much fat.
  - D. Too much flour.
9. Circle the correct placement on a pan for baking powder biscuits.
  - A. 1/2 inch apart.
  - B. 3/4 inch apart.
  - C. Sides touching.
  - D. 1/4 inch apart.
10. From the list below, circle the characteristics of a quality biscuit.
  - A. Dark brown top.
  - B. Golden brown top.
  - C. Flaky interior.
  - D. Mealy interior.

TURN ON PROJECTOR AND RECORDER.

## APPENDIX D



## APPENDIX E

Table 4. Average product scores, program A.<sup>1</sup>

| Factor           | Average Scores |     |     |     |     |     |
|------------------|----------------|-----|-----|-----|-----|-----|
|                  | Student Number |     |     |     |     |     |
|                  | 1              | 2   | 3   | 4   | 5   | 6   |
| Shape            | 4              | 3.5 | 5   | 4.5 | 4.5 | 4   |
| Size             | 4.5            | 3.5 | 4   | 4.5 | 4.5 | 4.5 |
| Color (external) | 4              | 5   | 5   | 4.5 | 5   | 4.5 |
| Crust            | 4.5            | 4.5 | 4.5 | 4   | 4.5 | 4   |
| Color (internal) | 5              | 5   | 5   | 5   | 5   | 4.5 |
| Grain            | 4.5            | 4.5 | 5   | 4   | 5   | 4.5 |
| Tenderness       | 4.5            | 4.5 | 4.5 | 5   | 5   | 4.5 |
| Flavor           | 4.5            | 4.5 | 5   | 4.5 | 5   | 4.5 |

<sup>1</sup>Average student and investigator scores based on a 5-point Hedonic scale:

- 5 Very desirable
- 4 Desirable
- 3 Acceptable
- 2 Undesirable
- 1 Very undesirable

Table 5. Average product scores, program B.<sup>1</sup>

| Factor           | : | Average Scores |   |     |   |     |   |     |   |     |
|------------------|---|----------------|---|-----|---|-----|---|-----|---|-----|
|                  | : |                |   |     |   |     |   |     |   |     |
|                  | : | Student Number |   |     |   |     |   |     |   |     |
|                  | : | 7              | : | 8   | : | 9   | : | 10  | : | 11  |
| Shape            |   | 3.5            |   | 4   |   | 4.5 |   | 4.5 |   | 4.5 |
| Size             |   | 3.5            |   | 4.5 |   | 4   |   | 5   |   | 5   |
| Color (external) |   | 5              |   | 4.5 |   | 4.5 |   | 5   |   | 5   |
| Crust            |   | 4.5            |   | 4   |   | 4.5 |   | 5   |   | 4.5 |
| Color (internal) |   | 5              |   | 4   |   | 5   |   | 5   |   | 5   |
| Grain            |   | 3.5            |   | 4   |   | 4   |   | 4.5 |   | 5   |
| Tenderness       |   | 4              |   | 4   |   | 4.5 |   | 5   |   | 5   |
| Flavor           |   | 4              |   | 4.5 |   | 4.5 |   | 5   |   | 4   |

<sup>1</sup>Average student and investigator scores based on a 5-point Hedonic scale:

- 5 Very desirable
- 4 Desirable
- 3 Acceptable
- 2 Undesirable
- 1 Very undesirable

COMPARISON OF TWO SELF-STUDY TECHNIQUES  
FOR QUANTITY FOOD PRODUCTION

by

DORIANN HILTON

B.S., Kansas State University, 1970

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AN ABSTRACT OF A MASTER'S THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

Department of Institutional Management

KANSAS STATE UNIVERSITY  
Manhattan, Kansas

1971



## ABSTRACT

Increased demand for professional food service personnel is forcing educators to examine and evaluate new methods of instruction. To effectively utilize student and teacher time, new methods of self-instruction are being adapted. Basic to most curriculums in food service management is a course in quantity food preparation, which generally is an application of basic principles to quantity food preparation. Students may have various backgrounds and interests in the food service industry. Self-instruction programs are being considered as one approach to effective use of class time and to level student background differences.

The purpose of this study was to develop two self-instruction programs for a college-level quantity food preparation course and to compare their effectiveness.

The Task-unit concept for training employees was adapted to instruct college-level students in the preparation of baking powder biscuits. This concept included instructional sheets containing columns for "what to do" and "how to do it" for each procedure. Principles involved in each step and illustrations were included. The sheets were re-named Detailed Process Guides. Using the same method of preparing biscuits, a slide and tape program was produced.

The effectiveness of the programs was tested with 11 college sophomores registered in Home Economics curriculums. Students were divided into two groups according to declared majors. Six Dietetics and Institutional Management majors studied Program A, Detailed Process Guides. Five other Home Economics majors studied Program B, a slide and tape program.

Students answered written objective pre- and post-tests. After one week of study, students prepared and evaluated the product. All study time connected with the program was recorded.

Student gain in test scores was not significantly different between programs. No significant difference was found in the amount of study time spent on each program.