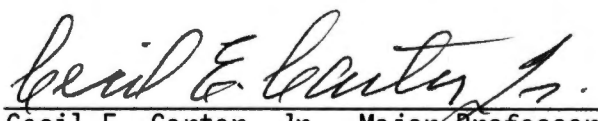


To the Graduate Council:

I am submitting herewith a thesis written by Mary Vickers Clark entitled "Evaluation of a Microwave Home Study Course As An Effective Extension Teaching Method in Sullivan County, Tennessee." I have examined the final copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Agricultural Extension.


Cecil E. Carter, Jr., Major Professor

We have read this thesis
and recommend its acceptance:




Accepted for the Council:


Vice Provost
and Dean of The Graduate Council

EVALUATION OF A MICROWAVE HOME STUDY COURSE AS AN
EFFECTIVE EXTENSION TEACHING METHOD IN
SULLIVAN COUNTY, TENNESSEE

A Thesis
Presented for the
Master of Science
Degree
The University of Tennessee, Knoxville

Mary Vickers Clark

March 1985

AG-VET-MED.

Thesis
85
.C43

ACKNOWLEDGMENTS

A special thanks is extended to Dr. Cecil E. Carter, Jr., the graduate chairman for this thesis, for his kind assistance and guidance. I also wish to express my appreciation to the other members of the graduate committee, Dr. Robert S. Dotson, and Mrs. Maxine W. McManus, for their assistance and helpful suggestions in reviewing this thesis.

Extreme gratitude is expressed to the University of Tennessee and the Agricultural Extension Service for providing the Extension Winter Shortcourse program and educational assistance which made this graduate study possible.

Sincere appreciation is felt for everyone in the Agricultural Extension Education Department for their helpfulness and friendship.

A special thank you goes to my fellow students, co-workers, and family for their support and encouragement.

ABSTRACT

The purpose of this study was to determine the effectiveness of an eight-lesson microwave home study course conducted by the Extension staff in Sullivan County, Tennessee. An initial 327 people enrolled in the course, completed the first lesson and the pretest. A total of 128 respondents completed both the pretest and post-test and their scores were used in the analysis.

Scores and some personal data from pretest and post-test were used to: (1) compare characteristics of participants who continued the course through to the post-test with those who did not; and (2) study the relationships between the number of lessons completed and improvement scores.

Computations were made by the University of Tennessee Computer Center. The analysis of variance F-test, T-test and chi square were statistics used. A probability level of .05 was accepted as being statistically significant.

Findings indicated that personal and family characteristics did not significantly influence how much respondents participated in the home study. The respondents who had received Extension information by radio, television or newspaper were more active participants. Other methods of Extension contacts did not significantly affect the levels of participation.

Homemakers with pre-school age children or no children at home completed the most lessons. It was also found that calling the

Extension office was the only method of Extension contact significantly related to the number of lessons completed.

It was found that completing the lessons significantly influenced improvement in three aspects of microwave cooking: application, utensils, and principles. The homemakers who had completed the most lessons showed the highest total improvement scores.

Respondents showed a significant improvement in all five aspects of microwave cooking studied (meal preparation, application, techniques, utensils and principles) after participating in the microwave home study course.

Findings indicated that the higher respondents rated the home study course the more improvement they showed. Homemakers who did not complete the course because of family obligations, lack of time, or cost had significantly lower improvement scores. The way respondents used the home study course lessons was shown to be significantly related to their improvement scores.

Implications and recommendations for further study were also included.

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CHAPTER I

BACKGROUND AND PROBLEM

1. INTRODUCTION

An essential function of the Extension worker is to create situations in which others develop educationally. Effective Extension methods must: (1) provide people with an opportunity to learn; and (2) stimulate mental and physical activity that produces the desired learning. Varying situations and the different stages of the adoption process of the clientele require different Extension teaching methods to be most effective. People learn best in different ways; some by listening, some by seeing, some by doing, and still others through discussion (4:1).*

Meetings are one of the oldest and most important methods of Extension training. Properly arranged and conducted, they rank high in ratio of practices adopted in relation to cost as compared with other methods (4:1). However, ever changing socio-economic conditions and demands create the continuing necessity to shift programs and demands to reach clientele. The rate of change has accelerated drastically during the past decade, requiring the Agricultural Extension Service to begin offering educational alternatives to meetings. The

*Numbers in parentheses refer to alphabetical listed references in the Bibliography; those after the colon are page numbers.

home study course is one such method of providing learning situations without the necessity of attending meetings.

Correspondence instruction has taken place in the United States for over a hundred years (2:218). Its acceptance and use as a teaching tool for Extension has only just begun to be fully explored. There has been a steady increase in the last few years of home study materials being developed by Extension home economic specialists. This involves a departure from the usual teaching methods of the agents, but provides new and exciting potentials for Extension to reach and teach heretofore inaccessible audiences.

2. NEED FOR THE STUDY

The growing acceptance and use of microwave ovens has created an increased interest in homemakers in receiving instructions on their use. An eight-lesson microwave home-study course was offered March-August 1983, as a means to respond to this need in Sullivan County, Tennessee.

An evaluation of the effectiveness of the microwave Extension home-study course was needed to serve as a basis for offering other home study instruction in the future. No previous study has been made to identify the respondents to an Extension home-study course or to evaluate the effectiveness of this instruction method. Likewise, a review of literature indicated no such effort had been made earlier in Tennessee. Therefore, the study was needed to establish target audiences in which the home-study course is an effective method of instruction.

Sullivan County, located in the extreme Northeastern corner of Tennessee, has both urban and rural characteristics. It is the fifth largest county by population in Tennessee including two major urban areas, Kingsport and Bristol.

Prior to the present study, observations in Sullivan County indicated that many more homemakers were interested in the educational programs offered by Extension than were actually participating in them. A large majority of young homemakers in Sullivan County, as in other Tennessee counties, are either employed outside the home or have small children at home. Consequently, these homemakers are not always able to attend Extension sponsored meetings.

It was felt that additional information was needed by the Sullivan County Extension staff to determine if the home study course would be an effective teaching alternative to reach more of these homemakers with educational programs.

3. STATEMENT OF PROBLEM

This study was designed to determine the effectiveness of home study instruction as an educational tool under specified conditions in Sullivan County, Tennessee.

Little was known prior to the present study regarding the characteristics of respondents to Extension home-study programs or to their response to this type of teaching method. Since home-study programs are used in many similar counties as a means of communication between Extension Agents and their clientele, it was felt that such a study might have applications for them as well.

4. PURPOSE AND OBJECTIVES OF STUDY

The major purpose of this study was to determine the effectiveness of the microwave home study instruction as a teaching method for Extension education in Sullivan County, Tennessee.

More specifically, the objectives were:

1. To compare certain characteristics of respondents who initially enrolled in the home study course, those who followed it through to completion, and those who did not.
2. To characterize the different respondent groups according to:
 - a. Personal and Family Characteristics,
 - b. Previous Extension Contact.
3. To comparatively analyze changes in microwave use following exposure to the eight-lesson series.
4. To determine target audiences for which the home study instruction is an acceptable teaching method.

5. DESCRIPTION OF THE MICROWAVE HOME STUDY COURSE

The microwave home study course used in this study was developed by the Housing and Equipment Specialist of the University of Tennessee Extension Service. It consisted of eight lessons. Participants received one lesson at a time and could complete the lesson at their own pace. Each of the lessons included basic information on microwave cookery as well as publications and recipes to illustrate the

lesson. The lessons also had a number of experiments and activities to be completed. Once these were completed, the participant returned the homework to the Sullivan County Extension Office.

All instruction and correspondence for the course was conducted through the mail. A lesson was mailed every three weeks. Participants were encouraged to ask questions or make comments on the homework assignment sheets. The Extension agent reviewed each returned assignment sheet to answer questions, mark correct or incorrect responses, and make comments as appropriate.

The lesson topics included in the home study course were:

Lesson 1: MICROWAVE BASICS

- understanding microwaves
- safety
- cleaning
- utensils

Lesson 2: MICROWAVE TECHNIQUES

- recipe conversion
- reheating leftovers
- standing time, doubling time
- utensils to use

Lesson 3: MICROWAVE MANAGEMENT

- sequence of cooking
- energy usage

Lesson 4: MICROWAVING BREADS AND CEREALS

- rice and pasta

- quick bread
- cookies, cakes and pastry

Lesson 5: MICROWAVING MILK, EGGS AND CHEESE

Lesson 6: MICROWAVING VEGETABLES AND FRUITS

- preparing fresh, frozen, canned
- stir frying
- blanching
- fruit desserts

Lesson 7: MICROWAVING MEATS

- browning dishes
- defrosting
- casseroles
- preparing meats, poultry, fish

Lesson 8: MICROWAVING JAMS, JELLIES AND CANDIES

6. DEFINITION OF TERMS

In order that the author and reader may have a common understanding of terms used in this study, certain terms are defined as follows:

1. Home Study Course. A set of planned, written lessons designed to instruct those receiving it through the mail from the Extension Agent.
2. Respondents. Those persons enrolled in the educational home study course and returning the evaluation at the end of each lesson.

3. Home Demonstration Club Member. Refers to homemakers affiliated with an organized educational group sponsored by the Agricultural Extension Service.
4. Homemaker. An individual having primary responsibility for establishing and maintaining the family home environment.
5. Clientele. People in audience Extension agents work with.
6. Extension Contact. The number of general Extension meetings attended, visits and telephone calls to the County Extension Office and newsletters received.
7. Level of Participation. Division of respondents into groups (starters and active participants) for comparison.
8. Starters. Those persons who enrolled in the home study course and completed pretest but not the post-test.
9. Active Participants. Those persons who enrolled in the home study course and completed both the pretest and post-test.
10. Meal Preparation. The number of ways the microwave oven was used in meal preparation. This included reheating leftovers, defrosting, for a complete meal, in addition to conventional oven and for individual steps in preparing recipes.
11. Application. The number of food types or purposes for which the microwave oven was used. This included: meat, fish, poultry, canned vegetables, fruit, casseroles, eggs, bread, noodles, rice, cooked cereal, cakes, cookies, candy,

cheese recipes, milk recipes, drying herbs, toasting nuts, making croutons, rehydrate dried fruit, drying flowers, making dough ornaments, making play dough, blanching vegetables and making jams or jellies.

12. Techniques. The number of recommended methods used in microwave cooking to aid in uniform cooking. These techniques included: rotating dish during cooking time, stirring foods once or twice during cooking, allowing for standing or carryover time, rearranging portions, shielding part of dish, covering dish, sequence cooking and reducing portion sizes.
13. Utensils. The number of recommended utensils used in cooking with the microwave oven. These included: wooden spoons, plastic wrap, waxed paper, paper towels, 4-cup measure, tube pan, browning dish, cooking bags and individual casseroles.
14. Principles. The number of correct responses to questions concerning an understanding of microwave cooking.
15. Improvement Scores. The increase in recommended uses or correct responses from pretest to post-test.

CHAPTER II

METHODS AND PROCEDURES

1. STUDY ORGANIZATION

The study was organized into two chapters of findings. The first chapter (i.e., Chapter IV) was designed to compare characteristics of homemakers who enrolled in the microwave home study course and the influence of these characteristics on levels of participation and the number of lessons completed. This chapter was divided into three sections for analysis and reporting. The first section consists of an analysis of relationships between characteristics of homemakers and their levels of participation. The second section is an analysis of the relationships between the characteristics of homemakers and the number of lessons they completed. The third section involves an analysis of the relationships between the number of lessons completed by homemakers and their pretest, post-test and improvement scores.

The second chapter of findings (i.e., Chapter V) was designed to determine the influence of selected factors on homemakers' improvement scores. This chapter was divided into two sections. The first consists of an analysis of pretest and post-test scores on five microwave use areas. The second section included an analysis of the relationships between homemakers' attitudes about the microwave home study and their improvement scores.

2. POPULATION AND SAMPLE STUDIED

Mass media was used to invite the general population to participate in the microwave home study course. The three newspapers in Sullivan County; Kingsport Times-News, Bristol Herald Courier and Sullivan County News, were used to announce the course.

Enrollment was closed after 750 people had called the Extension Office to request enrollment in the course. The population and sample included the 327 respondents who completed and returned the pretest. Comparisons were made with this group and the 128 respondents who completed the post-test at the end of the course.

3. METHOD OF SECURING DATA

A pretest was sent with the first lesson to all participants enrolled in the microwave home study course (see Appendix A, page 81). It was designed to discover some personal and family characteristics of respondents as well as measure their use and knowledge of microwave cooking, before taking the course. Pretest data included the personal and family characteristics: (1) age, (2) number in family, (3) age of youngest child, (4) education, and (5) years they had owned a microwave. It was also asked whether or not respondents had ever had previous contact with Extension through any of the following methods: (1) membership in a Home Demonstration Club, (2) attended workshops or classes, (3) received newsletter, (4) visited the Extension office, or (5) received Extension information by radio, television or newspaper.

Pretest and post-test data concerning microwave cooking skills and knowledge include five principle sections:

1. Meal preparation which denoted the number of ways the microwave oven was being used during meal preparation.
2. Application which recorded which or how many various types of food participants were preparing in the microwave oven.
3. Utensils used which indicated how many of the recommended utensils participants were using in their microwave cooking.
4. Principles which involved yes or no questions concerning knowledge and understanding of how microwave cooking works.

After the course was completed by mail, a post-test was sent to all participants. It repeated the questions concerning microwave use for comparison with pretest responses. In addition, it included data related to responses of homemakers to the home study course. This information was divided into three sections: (1) rating of course, (2) reasons for not completing the course, and (3) how they had used the sessions (see Appendix B, page 86).

All communications were completed by mail.

4. ANALYSIS OF DATA

The analysis of variance F-test, the T-test and chi square were statistics used to determine relationships between variables. The .05 probability level was chosen to indicate significant difference. Computations were made by the University of Tennessee Computing Center.

Data were tabulated and frequencies and percents were shown in tables. In Chapter IV the analysis of variance F-test was selected to determine relationships between number of lessons completed and characteristics of homemakers and pretest and post-test scores. The chi square was used to test the significance of relationships between characteristics of homemakers and levels of participation.

In Chapter V the T-test was used to make comparisons of pre-test and post-test scores on microwave use. The analysis of variance F-test was selected to determine relationships between homemakers' attitudes to the home study course and their improvement scores.

CHAPTER III

RELATED STUDIES

1. INTRODUCTION

According to Lauridsen's 1981 study of adult education (8:1), a successful adult education program is one that meets the needs of its clientele and is perceived to have improved their lives. The Agricultural Extension Service accepts this premise in its efforts to reach and teach potential clients in Tennessee counties with educational information.

Mass media is being increasingly used by Extension home economists to provide educational opportunities for larger audiences. Home study instruction is an Extension mass media teaching method along with others such as newsletters, television series, radio programs and news columns.

Various studies have been made relative to home study instruction in other fields of education. A review of available literature indicated the problem to be one of major interest and importance to Extension workers, though only a limited number of related studies was found concerning similar mass media teaching methods in Extension education. Both Boyce's 1977 study on newsletters and Dixon's 1973 study concerning educational TV series found these teaching methods reasonably effective for Extension home economics programs.

2. ADVANTAGES OF HOME STUDY

Home study courses provide an educational opportunity for persons who because of age, poverty, occupation, situation or some other reason cannot avail themselves of oral instruction (5:12).

Some commonly accepted advantages of Extension home study courses include:

1. Larger audiences can be accommodated.
2. Non-traditional clientele can be involved.
3. The Agent has time to "look up" answers to questions.
4. Respondents must learn to use their own equipment and facilities to carry out the instructions and experiments.

Other advantages of home-study instruction cited from the literature include:

1. Study at home does not interrupt the student's work or home responsibilities (10:6).
2. Provides instruction to which respondents would otherwise lack access (9:23).
3. Written answers can be studied and kept for future reference (10:6).
4. Requires student to investigate and be independent in his study which creates a confidence in his answers (5:12).
5. Easier for students to work at their own pace (6:21).
6. Easier for students to plan their study program and assess their progress (6:21).

7. Some people prefer studying on their own to studying in a class with other people (6:21).
8. Ordinarily in a classroom only one or two people are called on to answer questions where the home study student must answer every question (11:20).
9. Writing out answers cultivates the habit of exact statement, demands greater precision of knowledge, and thus requires more study (11:20).

3. DISADVANTAGES OF HOME STUDY

Lauridsen cautions against emphasizing programs such as home study courses that require no activity from adults, since life satisfaction for adults of all age stages is enhanced by activity and the process of "going places" (8:55).

Disadvantages of using the home study teaching method for the Extension Agent are:

1. The agent must build and maintain mailing lists.
2. The home-study lesson must compete in the mail box.
3. Agents must have certain minimum facilities (12:153).

In addition, there is often a high initial development cost (11:22).

When compared to the instruction in a classroom or group meeting, the home study student misses the personal "magnetism" of the teacher, the incidental help offered by the teacher and fellow classmates, and the ease of reciting by voice rather than in writing. In addition, he experiences the possible difficulty of working in isolation (11:19-24).

Several studies cite disadvantages of home study programs for the students such as:

1. Seems impersonal (14).
2. Lack of opportunity for classroom discussion (15).
3. Incomplete or delayed response from instructor (10,13,14,15).
4. Low motivation (13,14).
5. Overdependence upon written word (13).
6. Absence of good interest building devices (13,14).
7. Rigidity of formal process (13).
8. Imperfect conceptualization (13).
9. Inadequate experiences involving all the senses (13).

The respondent to a home study course is faced with the problems of developing and maintaining sufficient discipline to assign time for regular study (15:165).

4. CHARACTERISTICS OF RESPONDENTS

Education

Read indicated that communication is most effective when Agents know their audience and the reasons for communicating with them. Since knowledge levels are not always known and the needs not always evident, mass media instruction should be directed toward the middle ground (12:28).

The use of the home study program relies almost exclusively on the respondent being able to read and understand the text and instructions. Participants from the lowest and highest educational

brackets use the correspondence method less than those from the middle range of the continuum (9:21).

In Dixon's findings, 56% of the respondents to a television series on furniture renovation had a high school education. Likewise those completing the renovation tended to have at least some high school work. Only 26% of the respondents had some college education (3:21).

Boyce found that although 63% of the homemakers enrolled for the money management newsletters had no college training, those with some college training tended to score significantly higher in the skills section of tests (1:47-48).

Age

Participants in home study courses have been found to be relatively young. For example, student profiles developed from statistical data on correspondence students compiled from different universities showed the median age to be 26 years old. Two reports indicate that sex and age must be considered together. Up to and including age 35 there are more men than women taking home study courses but after age 35 there are more women (9:17-19).

Dixon found that the majority of viewers of educational television series were in their thirties (3:9). Boyce's study of teaching through newsletters found that the average age of respondents was 47.5 years for home demonstration club members and 42.0 years for non-members (1:47).

Holmberg says that the age group 25 to 35 seems to be the largest one in most systems (6:21).

Occupation

There is no evidence that all home study students should be regarded as a homogenous group. The only common factor is that, with few exceptions, these students are adults and consequently as a rule are gainfully employed and/or are housewives (6:21).

Dixon found that television courses offered educational opportunities to those who could not otherwise attain it, mainly housewives with small children (3:10).

Several studies indicate a shift towards more professionals and skilled workers taking correspondence courses (9:19).

5. ATTRITION/COMPLETION RATES

It has long been recognized that many students enrolling in correspondence study do not complete the course of study. Information available from commercial schools, the U.S. Armed Forces Institute, and universities offering home study programs suggest a dropout or noncompletion rate of around 80% (10:19). The study by Angelina Wong and S. C. P. Wong cited dropout rates of between 48 and 79%. They found that students who did more than half of the assignments were significantly more likely to complete the course. Furthermore, the more assignments they submitted, the higher their final examination grade tended to be (16:165).

Correspondence instruction has taken place in the United States for over a hundred years; yet correspondence educators have been unable to raise the persistently low completion rates of correspondence students. The problem is one of motivating correspondence students at a distance, to begin promptly and to continue to course completion (2:218).

In a study by DiSilvestro and Markowitz it was found that the use of a study contract had a positive effect on student's promptness in submitting their first lesson and increased the ratio of starting to nonstarting students. Students who submitted three or four assignments had a significantly better chance of completing their courses (2:220-221).

Wong suggested that students may feel a certain degree of commitment and involvement in the course after completing a few assignments and this could motivate them to go on to complete the course (16:168).

Postcards and letters of encouragement were found to significantly reduce attrition in correspondence study courses in the study by Sabers, Pfeiffer and Ragsdale. They suggested that the student receiving what he considers a personal letter asking him to submit lessons may put the correspondence study course higher on his list of priorities. Thus, the letter of encouragement may significantly increase the number of lessons submitted. Additionally, they recommend that letters of encouragement be sent a considerable length of time after enrollment so that the letter will not be viewed as a routine follow-up of correspondence study enrollment (13:87-90).

In Hughes doctoral dissertation he found that the purpose for which a course is taken has an effect upon its completion. Courses taken for professional-vocational improvement (which will be the case for home economics home study courses) have the lowest rate of completion. Motivation such as taking a course to get a college degree, teacher certification, etc., results in more successful completion. His study showed statistically significant relationships between successful completion and having a college degree. He explains this by saying that college graduates are likely to have developed better study habits. Also, Hughes found a positive relationship between completion and prior experience with this type of educational experience.

CHAPTER IV

INFLUENCE OF CHARACTERISTICS OF HOMEMAKERS ON LEVELS OF PARTICIPATION AND NUMBER OF LESSONS COMPLETED

The purpose of this chapter is to describe the relationships between characteristics of homemakers who enrolled in the microwave home study course and the number of lessons they completed. These findings are presented in three tables with each table constituting a section.

Section 1 presents findings regarding the relationships between characteristics of homemakers and levels of participation.

Section 2 deals with findings concerning relationships between characteristics of homemakers and the number of lessons completed.

Section 3 presents data dealing with relationships between pretest, post-test and improvement scores and number of lessons completed.

1. RELATIONSHIPS BETWEEN CHARACTERISTICS OF HOMEMAKERS AND LEVELS OF PARTICIPATION

Personal and family characteristics selected for this study include: (1) age, (2) number in family, (3) age of youngest child, (4) education, and (5) years owned a microwave oven.

The study also included data concerning whether or not homemakers had had contact with Extension programs through six methods: (1) HDC member, (2) attended meetings, (3) received newsletter, (4)

visited Extension office, (5) called Extension office, and (6) received Extension information by radio, television or newspaper.

The levels of participation in the home study course were: (1) starters, those who completed only the pretest, and (2) active participants, those who had completed both the pretest and post-test.

Table 1 presents data regarding relationships between characteristics of homemakers and levels of participation.

Personal and Family Characteristics

Age. The mean age was slightly higher for the active participants who completed both the pretest and post-test (46.5 years) than the starters, those completing only the pretest (43.0 years). The chi square test indicated the levels of participation was not significantly related to ages of the homemakers.

Number in family. A slightly higher percent of the active participants than of the starters had only one or two persons in the family. However, the mean number of family members was the same (3.2) for both the starters and active participants. When differences in number of family members among starters and active participants were tested by chi square, differences were not significant at the .05 level. Therefore, starters and active participants did not differ significantly as to size of family.

Age of youngest child. The starters had an average age of youngest child of 8.4 years old versus 7.4 years old for active participants. The starters and active participants did not differ significantly as to age of youngest child.

TABLE 1

RELATIONSHIPS BETWEEN CHARACTERISTICS OF HOMEMAKERS AND
LEVELS OF PARTICIPATION

Characteristic	Levels of Participation				χ^2	P
	Starters (n=199)		Active Participants (n=128)			
	Number	Percent	Number	Percent		
Personal and Family Characteristics						
<u>Age</u>						
Under 40	99	49.7	56	43.8		
41-60	76	38.2	47	36.7		
61-over	24	12.1	25	19.5	3.8	0.14
Mean Age		43.0		46.5		
<u>Number in family</u>						
1-2	66	33.2	49	38.3		
3-4	104	52.3	59	46.1		
5-over	28	14.1	20	15.6	1.7	0.78
Mean number in Family		3.2		3.2		
<u>Age of youngest child</u>						
None	54	27.1	44	34.4		
1-5	45	22.6	23	18.0		
6-17	68	34.2	42	32.8		
18-over	32	16.1	19	14.8	2.4	0.49
Mean Age of Youngest Child		8.4		7.4		

TABLE 1 (continued)

Characteristic	Levels of Participation				χ^2	P
	Starters (n=199)		Active Participants (n=128)			
	Number	Percent	Number	Percent		
<u>Education</u>						
No college	90	45.2	56	43.8		
Some college	108	54.3	71	55.5	3.4	0.64
Mean Grades Completed		13.4		13.5		
<u>Years owned microwave</u>						
2-less	143	71.9	81	63.3		
More than 2	56	28.1	47	36.7	8.5	0.07
Mean Number Years Owned Microwave		2.0		2.3		
<u>Extension Contacts</u>						
<u>HDC Member</u>						
No	174	87.4	108	84.4		
Yes	25	12.6	20	15.6	0.4	0.50
<u>Attended workshops</u>						
No	161	80.9	99	77.3		
Yes	38	19.1	29	22.7	0.5	0.49

TABLE 1 (continued)

Characteristic	Levels of Participation				χ^2	P
	Starters (n=199)		Active Participants (n=128)			
	Number	Percent	Number	Percent		
<u>Received newsletters</u>						
No	158	79.4	95	74.2		
Yes	41	20.6	33	25.8	1.0	0.31
<u>Visited Extension Office</u>						
No	151	75.9	96	75.0		
Yes	48	24.1	32	25.0	0.1	0.91
<u>Called Extension Office</u>						
No	93	46.7	49	38.3		
Yes	106	53.3	79	61.7	2.3	0.12
<u>Received Extension information by radio, TV, or newspaper</u>						
No	89	44.7	39	30.5		
Yes	110	55.3	89	69.5	5.6	0.02

Education. Slightly higher percentages (55.5) of the active participants had some education beyond high school. The mean number of grades completed was 13.4 for the starters and 13.5 for the active participants. This difference in education was not significant. However, it would appear that the level of education for all enrollees was higher than the general population for Sullivan County.

Years owned microwave. The mean number of years the starters had owned a microwave was 2.0 compared with 2.3 for the active participants. The chi square test revealed that these differences were not significant at the .05 level.

Extension Contacts

HDC member. A high proportion of the homemakers taking the home study course were not members of an organized Extension home demonstration club. Of the starters, only 12.6% were home demonstration club members compared with 15.6% of the active participants. Therefore, starters did not differ significantly from active participants as to membership in a home demonstration club.

Attended workshop. Few of the homemakers taking the home study course had attended Extension workshops. Starters differed only slightly from active participants (19.1 versus 22.7) as to participation in Extension workshops. These differences were not significant. Therefore, participation in Extension workshops did not significantly influence levels of participation in the microwave home study course.

Received newsletters. The majority of the homemakers in all levels of participation had not received Extension newsletters. Starters did not differ significantly from active participants (20.6 versus 25.8) as to receiving Extension newsletters. Therefore, receiving Extension newsletters did not significantly affect the levels of participation.

Visited Extension office. Most of the respondents had not visited the Extension office. The starters differed only slightly from active participants (24.1 versus 25.0) as to percent who had visited the Extension office. Therefore, visiting the Extension office did not significantly influence levels of participation in the microwave home study course.

Called Extension office. A higher proportion of the active participants than of the starters (61.7 versus 53.3) had called the Extension office. These differences, however, were not significant at the .05 level.

Received Extension information by radio, TV, or newspaper. Many of the respondents had used mass media; radio, TV, or newspaper, to receive Extension information. Almost 70% (69.5) of the active participants responded that they had received information this way as compared to only 55.3% of the starters. These differences were significant at the .05 level. Therefore, there was a significant relationship between receiving Extension information by mass media

and level of participation in the microwave home study course. Active participants were more likely to have received Extension information through mass media.

Discussion

Table 1 indicates that the personal and family characteristics of age, number in family, age of youngest child, education and years the respondents had owned a microwave did not significantly influence their level of participation in the microwave home study course. These data, however, do help to identify the target audiences for the microwave home study course. The average respondents were in their mid-40's, had 3-4 members in the family, had school age children, had completed some post-high school education, and had owned a microwave about 2 years.

The respondents who had received Extension information by radio, TV, or newspaper were more active participants than those who had not. This could be because these respondents were already responsive to mass media communications, and completing a home study course was not such a "new" method of learning for them.

Other methods of Extension contacts did not significantly affect the levels of participation. It was noted, however, that the majority of respondents were not traditional clientele for Extension. They had not had contact with Extension through HDC or other Extension workshops, visiting or calling the Extension office, or receiving newsletters. These data indicate that home study courses may provide

Extension with a viable method of reaching new segments of the general public with educational information.

2. RELATIONSHIPS BETWEEN CHARACTERISTICS OF HOMEMAKERS AND NUMBER OF LESSONS COMPLETED

Five areas of personal and family characteristics were analyzed to see if they were related to the number of lessons completed. They were: (1) age, (2) number in family, (3) age of youngest child, (4) education, and (5) years owned microwave. The six methods of Extension contact also studied were: (1) HDC member, (2) attended meetings, (3) received newsletters, (4) visited Extension office, (5) called Extension office, and (6) received Extension information by radio, television or newspaper.

Table 2 shows the relationships between characteristics of homemakers and number of lessons they completed.

Personal and Family Characteristics

Age. The majority of the participants were in the under 40 age group but this group completed an average of 3.1 lessons. Older homemakers (61-over) completed the most lessons, an average of 4.3. Those in the middle age range, (41-60 years) completed fewer lessons (2.9). These differences in the mean number of lessons completed, as tested by the analysis of variance F-test, were not significant at the .05 level. Therefore, the number of lessons completed did not differ significantly as to the ages of the participants.

TABLE 2

RELATIONSHIPS BETWEEN CHARACTERISTICS OF HOMEMAKERS AND
NUMBER OF LESSONS COMPLETED

Characteristic	Homemakers		Mean Lessons Completed	F-value	P
	Number	Percent			
<u>Personal and Family Characteristics</u>					
<u>Age</u>					
Under 40	55	43.0	3.1		
41-60	47	37.0	2.9		
61-over	25	19.7	4.3	2.5	0.09
<u>Number in Family</u>					
One	7	5.5	3.9		
Two	42	33.0	3.7		
Three	24	18.9	3.9		
Four	34	26.8	2.9		
Five-over	20	15.7	2.0	2.0	0.09
<u>Age of Youngest Child</u>					
None	44	34.6	3.9		
1-5	23	18.1	4.4		
6-17	41	32.3	2.2		
18-over	19	15.0	2.9	4.7	0.00
<u>Education</u>					
Under 12	9	7.1	4.1		
Completed High School	47	37.3	3.3		
Attended College	32	25.4	2.8		
Completed College	26	20.6	3.5		
Post College	12	9.5	3.6	0.5	0.76

TABLE 2 (continued)

Characteristic	Homemakers		Mean Lessons Completed	F-value	P
	Number	Percent			
<u>Years Owned Microwave</u>					
Under one year	25	19.7	3.0		
One year	40	31.5	3.7		
Two years	16	12.6	2.5		
Three-Four years	25	19.7	3.4		
Five years-over	21	16.5	3.3	0.6	0.66
<u>Extension Contacts</u>					
<u>HDC Member</u>					
No	107	84.2	3.2		
Yes	20	15.7	3.7	0.4	0.51
<u>Attended Workshops</u>					
No	98	77.2	3.3		
Yes	29	22.8	3.2	0.01	0.94
<u>Received Newsletters</u>					
No	94	74.0	3.1		
Yes	33	26.0	3.8	1.4	0.24
<u>Visited Extension Office</u>					
No	95	74.8	3.1		
Yes	32	25.2	3.8	1.3	0.26

TABLE 2 (continued)

Characteristic	Homemakers		Mean Lessons Completed	F-value	P
	Number	Percent			
<u>Called Extension Office</u>					
No	48	37.8	2.6		
Yes	79	62.2	3.7	4.2	0.04
<u>Received Extension information by Radio, TV, or Newspaper</u>					
No	39	30.7	3.4		
Yes	88	69.3	3.2	0.1	0.71

Number in family. The number of lessons completed varied from a low of 2.0 by participants having five and over persons in the family to 3.9 by those having either one or three family members. Although these differences were not significant at the .05 level, the data strongly suggests that the levels of participation decreased as family size increased.

Age of youngest child. Homemakers with pre-school age children at home completed the most lessons, a mean of 4.4. Those with no children at home completed the second highest mean number of lessons, 3.9. Respondents with school age children and adult children at home completed fewer lessons (2.2 and 2.9, respectively). These differences in number of lessons completed by varying ages of youngest child were significant ($F\text{-value}=4.7$, $p=0.00$).

Education. Only 7.1% of the respondents had not completed high school but this group completed the highest number of lessons (4.1). The other education categories were very similar in the mean number of lessons completed, ranging from 2.8 to 3.6. These differences were not significant at the .05 level. Therefore, education did not significantly influence the number of lessons completed.

Years owned microwave. The highest percentage of the homemakers (31.5) had owned a microwave for one year. This group completed the most lessons, a mean of 3.7. Those who had owned a microwave two years completed the fewest number of lessons, 2.5. When analyzed

by the analysis of variance F-test years homemakers had owned a microwave was not significantly related to the number of lessons completed.

Extension Contacts

HDC member. While the majority of respondents (84.3%) were not HDC members, this group completed a mean of 3.2 lessons. Home demonstration club members, however, completed 3.7 lessons. Whether or not respondents were HDC members was not significantly related to the mean number of lessons homemakers completed.

Attended workshops. The mean number of lessons completed was nearly the same for those who had attended Extension workshops (3.2) and those who had not attended (3.3). These differences were not significant at the .05 level. Attending Extension workshops was not significantly related to the number of lessons completed.

Received newsletters. Although only 26.0% of the homemakers indicated they had received Extension newsletters, this group completed a mean of 3.8 lessons. This is compared to 3.1 lessons completed by the 74.0% who had not received newsletters. However, when tested by the analysis of variance F-test this was not a significant difference.

Visited Extension office. Homemakers who had visited the Extension office completed more lessons (3.8) than those who had not

(3.1). This difference was not significant at the .05 level. Therefore, visiting the Extension office was not related to the number of lessons completed.

Called Extension office. More than half of the respondents (62.2%) had called the Extension office. Those who had called the Extension office completed 3.7 lessons compared to 2.6 by those who had not. When tested by the analysis of variance F-test, the number of lessons completed was significantly related to whether or not participants in the microwave home study course had contacted the Extension office by telephone ($F\text{-value}=4.2, p=0.04$). Participants in the microwave home study course who had called the Extension office completed significantly more lessons.

Received Extension information by radio, TV, or newspaper. Almost 70% (69.3) of the homemakers indicated they had received Extension information by radio, TV, or newspaper. There was very little difference in the number of lessons completed than those who had not received Extension information through mass media (3.4 versus 3.2). These differences were not significant at the .05 level. Therefore, the number of lessons completed was not significantly influenced by whether or not the homemakers had received Extension information through mass media.

Discussion

Homemakers with pre-school age children or no children at home completed the most lessons. This may be because these respondents

spent more of their time at home and are thus better able to incorporate the home study course into their daily routine. Furthermore, they may receive less resistance to the experiments and changes in cooking practices in the microwave home study course than respondents with school age children in the family.

3. RELATIONSHIPS BETWEEN THE NUMBER OF LESSONS COMPLETED BY HOMEMAKERS AND THEIR PRETEST, POST-TEST AND IMPROVEMENT SCORES

The purpose of the analysis of data presented in this section was to determine relationships between the number of lessons completed by homemakers and their pretest, post-test and improvement test scores on five parts of the microwave home study course. Pretest, post-test and improvement scores were computed for each of the five test question areas (i.e., meal preparation, application, techniques, utensils and principles). The five parts of the tests are briefly described and the total possible scores on each are given below.

1. Meal preparation, the number of ways the microwave oven was used in meal preparation (15 points possible).
2. Application, the number of food types or purposes for which the microwave oven was used (28 points possible).
3. Techniques, the number of recommended methods used in microwave cookery to aid in uniform cooking (11 points possible).
4. Utensils, the number of recommended utensils used in cooking with the microwave oven (9 points possible).

5. Principles, the number of correct responses to questions concerning an understanding of microwave cooking (21 points possible).

The improvement score was computed by subtracting the post-test score from the pretest score.

Table 3 shows the relationships between pretest, post-test and improvement scores and number of lessons completed.

Meal Preparation

Pretest. Homemakers who indicated on the pretest that they used the microwave more ways in meal preparation, completed a larger number of microwave lessons. However, when tested by the analysis of variance F-test, the number of lessons completed did not differ significantly as to pretest score on meal preparation. Therefore, the number of lessons completed was not significantly related to the number of ways the microwave was used by homemakers prior to beginning the home study course.

Post-test. Respondents scoring 8-10, next to the lowest category in meal preparation completed the least number of lessons, 2.8. Those scoring highest, 14-over, on meal preparation completed the most lessons, 4.2. The analysis of variance F-test revealed that these differences were not significant at the .05 level. Therefore, scores on the number of ways the microwave was used at the end of the lessons was not significantly influenced by the number of lessons completed.

TABLE 3

RELATIONSHIPS BETWEEN THE NUMBER OF LESSONS COMPLETED BY HOMEMAKERS AND THEIR PRETEST, POST-TEST AND IMPROVEMENT SCORES

Scores on Microwave Use		Homemakers		Mean Lessons Completed	F-value	P
		Number	Percent			
Meal Preparation: Number of ways microwave oven was used in meal preparation (15 points possible)						
<u>Pretest</u>						
Under 8		10	8.0	2.6		
8-10		47	37.6	3.0		
11-13		59	47.2	3.4		
14-over		9	7.2	4.1	0.6	0.59
<u>Post-test</u>						
Under 8		5	3.9	3.4		
8-10		36	28.3	2.8		
11-13		77	60.6	3.4		
14-over		9	7.1	4.2	1.0	0.45
<u>Improvement Score</u>						
One-less		79	63.2	3.3		
Two-over		46	36.8	3.2	0.0	0.90

TABLE 3 (continued)

Scores on Microwave Use		Homemakers		Mean Lessons Completed	F-value	P
		Number	Percent			
Application: Number of food types or purposes for which the microwave oven was used (28 points possible)						
<u>Pretest</u>						
5-less		26	20.4	3.0		
6-8		49	38.6	3.0		
9-15		41	32.3	4.1		
16-over		11	8.7	2.2	2.3	0.08
<u>Post-test</u>						
5-less		11	8.7	2.0		
6-8		18	14.2	1.5		
9-15		56	44.1	2.6		
16-over		42	33.1	5.3	16.1	0.00
<u>Improvement Score</u>						
One-less		36	28.3	1.9		
2-5		42	33.1	2.3		
6-over		49	39.6	5.2	27.3	0.00

TABLE 3 (continued)

Scores on Microwave Use		Homemakers		Mean Lessons	F-value	P
		Number	Percent	Completed		
Techniques: Number of recommended methods used in microwave cookery to aid in uniform cooking (11 points possible).						
Pretest						
5-less		11	8.7	3.8		
6-7		48	37.8	3.0		
8-9		49	38.6	3.2		
10-over		19	15.0	3.7	0.5	0.69
Post-test						
5-less		6	4.7	2.5		
6-7		13	10.2	2.5		
8-9		61	48.0	3.4		
10-over		47	37.0	3.4	0.6	0.59
Improvement Score						
One-less		75	59.1	3.2		
Two-over		52	40.9	3.3	0.1	0.81

TABLE 3 (continued)

Scores on Microwave Use		Homemakers		Mean Lessons Completed	F-value	P
Utensils: Number of recommended utensils used in cooking with the microwave oven (9 points possible).		Number	Percent			
<u>Pretest</u>						
3-less		18	14.2	2.0		
4		26	20.5	3.4		
5		29	22.8	3.6		
6		30	23.6	3.1		
7-over		24	18.9	3.9	1.5	0.20
<u>Post-test</u>						
3-less		6	4.7	1.8		
4		17	13.4	1.8		
5		15	11.8	2.7		
6		38	29.9	3.0		
7-over		51	40.2	4.3	4.3	0.00
<u>Improvement Scores</u>						
One-less		75	59.1	3.2		
Two-over		52	40.9	3.3	0.1	0.81

TABLE 3 (continued)

Scores on Microwave Use	Homemakers		Mean Lessons Completed	F-value	P
	Number	Percent			
Principles: Number of correct responses to questions concerning an understanding of microwave cooking (21 points possible).					
<u>Pretest</u>					
9-less	14	17.7	1.4		
10-12	18	22.8	3.1		
13-15	22	27.8	2.7		
16-over	25	31.6	2.8	0.9	0.46
<u>Post-test</u>					
9-less	14	11.0	1.4		
10-12	18	14.2	3.1		
13-15	22	17.3	2.7		
16-over	73	57.5	3.8	3.9	0.01
<u>Improvement Scores</u>					
One-less	43	33.9	3.3		
Two-over	84	66.1	3.8	8.3	0.00
<u>Total Improvement Scores</u>					
Five-less	37	29.6	2.1		
Six-over	88	70.4	3.8	10.6	0.00

Improvement score. Data in Table 3 shows more homemakers (63.2%) having low (one-less) improvement scores on meal preparation. There was very little difference in the number of lessons completed by those with the lower improvement scores and those with higher improvement scores (3.3 versus 3.2). These differences were not significant according to the analysis of variance F-test. Therefore, the number of home study lessons completed did not differ significantly as to the homemakers' improvement in the number of ways they used their microwave oven.

Application

Pretest. Homemakers who had the highest scores on application prior to beginning the microwave home study course completed the lowest number of microwave lessons. However, the different number of lessons completed was not significant at the .05 level. Therefore, the number of lessons completed did not differ significantly as to homemakers score on application to microwave cooking prior to taking the course.

Post-test. Microwave home study course participants who scored highest (16-over) on application of microwave cooking also completed the greatest number of lessons (5.3) during the course. The mean number of microwave lessons completed was significantly related ($F\text{-value}=16.1, p=0.00$) to the scores made by participants on application of microwave cooking at the end of the home study course. Those completing more lessons tended to have higher post-test scores on the application of microwave cooking.

Improvement Score. The higher the improvement score on application, the more lessons the respondents had completed. The respondents scoring one-less completed a mean of only 1.9 lessons. Those scoring 2-5 completed 2.3 lessons. Respondents with the highest improvement scores, 6-over, completed a mean of 5.2 lessons. When the difference in the mean was tested by the analysis of variance F-test, the F value was significant at the .05 level. Therefore, the improvement score on microwave application was significantly related to the mean number of lessons completed ($F\text{-value}=27.3$, $p=0.00$). The number of lessons completed by participants tended to be higher for those who made higher improvement scores on microwave application.

Techniques

Pretest. The mean number of lessons completed was highest for those respondents with the lowest and the highest pretest scores on techniques (3.8 and 3.7, respectively). Most of the respondents scored in the mid-range. Those scoring 6-7 (37.8%) completed 3.0 lessons and those scoring 8-9 (38.6%) completed 3.2 lessons. The differences in the mean were not significant at the .05 level. Therefore, the number of lessons completed did not differ significantly as to pretest scores on techniques of microwave cooking.

Post-test. Respondents with post-test scores on techniques of both 5-less and 6-7 completed a mean of 2.5 lessons. Most of the respondents scored higher than this and completed more lessons (48.0%

scored 8.9 and 37.0% had scores of 10-over). Homemakers scoring in each of the two highest categories completed 3.4 lessons. These differences were not significant at the .05 level. Therefore, the number of lessons completed did not differ significantly as to homemakers' scores on application of techniques in microwave cooking at the conclusion of the course.

Improvement score. Respondents with higher improvement scores on techniques completed slightly more lessons in the home study course; 59.1% had an improvement score of one-less and completed 3.2 lessons. This is compared to 40% who scored two-over and completed 3.3 lessons. However, this observed difference was not significant at the .05 level. Therefore, the number of lessons completed did not differ significantly as to participants improvement score on application of microwave cooking techniques.

Utensils

Pretest. Pretest scores on the number of utensils used in microwave cooking did not show a significant relationship to number of lessons completed. Nevertheless, those respondents with the lowest scores (3-less) completed only 2.0 lessons while respondents with the highest score (7-over) completed the most lessons, a mean of 3.9. This was not a significant difference as tested by the analysis of variance F-test. Therefore, the number of lessons completed did not differ significantly as to participant's score on

the number of recommended utensils used in cooking with the microwave oven before the home study course was started.

Post-test. Data in Table 3 shows that as the post-test scores on utensils increased so did the mean number of lessons the respondents had completed. The highest percent (40.2) of the respondents scored 7-over and completed a mean of 4.3 lessons. This is compared to the 4.7% with the lowest scores (in the 3-less category) who completed only 1.8 lessons. The analysis of variance F-test revealed that these observed differences were significant at the .05 level. Therefore, the number of lessons completed was significantly related to participants post-test scores on the number of utensils used in cooking with the microwave oven ($F\text{-value}=4.3$, $p=0.00$).

Improvement scores. The respondents who showed an improvement of one-less on utensils completed a mean of 3.2 lessons. This was nearly the same as the 3.3 lessons completed by the respondents with higher improvement scores. This difference in the number of lessons completed was not significant at the .05 level.

Principles

Pretest. The mean number of lessons completed did not differ significantly as to pretest scores of participants on principles of microwave cooking. Respondents with scores of 10-12 completed 3.1 lessons while those in the highest scoring range completed only 2.8 lessons. However, when the differences in the mean were tested by

the analysis of variance F-test, the F-value was not significant at the .05 level.

Post-test. The majority of the respondents (57.5%) were in the highest post-test score category on principles of microwave cooking and they also completed the largest number of lessons (3.8). Respondents with the lowest score completed the least number of lessons, 1.4. This was found to be a significant relationship when tested by the analysis of variance F-test (F-value=3.9, $p=0.01$). Therefore, the number of lessons completed was significantly related to participants' post-test scores on principles of microwave cooking. Participants who completed more lessons tended to make higher post-test scores.

Improvement score. Respondents with higher improvement scores on principles of microwave cooking completed more lessons. The 66.1% of the respondents who had the higher improvement score on principles completed a mean of 3.8 lessons. This is compared to 3.3 lessons for those scoring one-less on improvement. The differences were shown to be significant at the 0.5 level. Thus, improvement scores on principles of microwave cooking was significantly related to the number of lessons participants completed. Those homemakers who completed more lessons tended to make higher improvement scores on the principles of microwave cooking at the conclusion of the home study course.

Total Improvement Scores

When the improvement scores of all five aspects of microwave cooking were totaled, 70.4% of the respondents showed they had increased the number of correct responses from pretest to post-test by 6 points or more. Respondents with the higher total improvement scores completed more lessons (a mean of 3.8) than those with lower total improvement scores (a mean of 2.1 lessons). When tested by the analysis of variance F-test these differences were significant ($F\text{-value}=10.6$, $p=0.000$). Thus, the total improvement scores were significantly related to mean number of lessons completed. Homemakers who completed a larger number of lessons made significantly higher total improvement scores.

Discussion

Homemakers who completed more lessons tended to make higher improvement scores on microwave application, utensils and principles. Participants' post-test and improvement scores on ways the microwave oven was used in meal preparation and the number of microwave cooking techniques used were not significantly related to the number of lessons completed.

Each lesson in the microwave home study course dealt with information, recipes and experiments on using the microwave for a different food group. The homemakers were exposed to more applications of microwave use with each lesson they worked on. The data seems to indicate that the lessons encouraged homemakers to experiment with

other foods and utensils and to have a better understanding of how a microwave oven works but it did not change their previous cooking practices.

Calling the Extension office was the only method of Extension contact significantly related to the number of lessons completed. The researcher believes calling the Extension office gave those respondents a more personal feeling of involvement with the Extension agent offering the course.

CHAPTER V

INFLUENCE OF SELECTED FACTORS ON HOMEMAKERS' IMPROVEMENT SCORES

The purpose of this chapter was to present findings regarding the influence of selected factors on homemakers' improvement scores. The comparisons of mean scores on pretest and post-test and the relationship of homemakers' attitudes to the home study course and their improvement scores also are shown. These findings are presented in two tables with each table constituting a section. The five aspects of microwave cooking selected for this study are: (1) meal preparation, (2) application, (3) techniques, (4) utensils, and (5) principles.

Section 1 presents findings regarding comparisons of pretest and post-test scores on five areas regarding microwave use.

Section 2 deals with the relationships between homemakers' attitudes to home study and their improvement scores.

1. COMPARISONS OF PRETEST AND POST-TEST SCORES ON FIVE MICROWAVE USE AREAS

In this section comparisons of pretest and post-test scores on meal preparation, application, techniques, utensils and principles are shown.

Table 4 presents data regarding pretest and post-test scores on microwave use in meal preparation, application, techniques, utensils and principles.

TABLE 4
COMPARISONS OF PRETEST AND POST-TEST SCORES ON
FIVE MICROWAVE USE AREAS

Microwave Use Areas	Mean Scores		T Value	df	P
	Pretest	Post-Test			
Meal Preparation	10.4	11.2	4.25	122	0.000
Application	8.9	13.1	9.49	127	0.000
Techniques	7.8	8.9	5.65	127	0.016
Utensils	5.2	6.0	5.21	127	0.000
Principles	12.0	14.8	6.76	127	0.000

Meal Preparation

The mean scores on number of ways the microwave oven was used in meal preparation increased from 10.4 on the pretest to 11.2 on the post-test. When tested by the T-test this difference was significant at the .05 level ($T\text{-value}=4.25$, $df=122$, $p=0.000$). On the average, participants tried 1.2 new ways of using the microwave oven between the beginning and the end of the microwave home study course. This was a 7.7% increase in number of ways the microwave was used.

Application

Homemakers used the microwave oven for more purposes and more types of food after participating in the microwave home study course. The mean scores on application increased from 8.9 on pretest to 13.1 on post-test. The analysis of variance T-test revealed that these observed differences were significant ($T\text{-value}=9.49$, $df=127$, $p=0.000$). On the average, participants increased their use of the microwave 4.2 points (i.e., number of food types or purposes for using microwave). This was an increase of 47% in the types or purposes of uses made of the microwave.

Techniques

After participating in the home study course respondents had increased the number of recommended methods they used to improve cooking techniques. The mean score of pretest was 7.8 compared to 8.9 on post-test. This observed difference was significant at the

.05 level when tested by the T-test (T-value=5.65, df=127, p=0.0016). This was a 14% increase in the number of techniques tried between pretest and post-test.

Utensils

The mean score on number of recommended utensils used in microwave cooking increased after participating in the home study course. The pretest score was 5.2 compared to 6.0 on post-test. When tested by the T-test this difference was significant at the .05 level (T-value=5.21, df=127, p=0.000). This was an increase of 3.4% in the number of utensils used between pretest and post-test.

Principles

The number of correct responses to questions concerning an understanding of the principles of microwave cooking increased from 12.0 on pretest to 14.8 on post-test. These observed differences were significant (T-value=6.76, df=127, p=0.000). This was an increase of 22% more correct answers on the post-test than on the pretest.

Discussion

Respondents showed a significant improvement in all five aspects of microwave cooking after participating in the microwave home study course. Mean scores on post-test showed an increase over pretest scores in meal preparation, application, techniques, utensils and principles.

The microwave home study course was thus seen to be a significantly effective method of education for those homemakers participating in it.

2. RELATIONSHIPS BETWEEN HOMEMAKERS' ATTITUDES ABOUT THE MICROWAVE HOME STUDY AND THEIR IMPROVEMENT SCORES

In this section respondents' attitudes to the microwave home study course were divided into three areas: (1) how they rated the course; (2) their reasons for not completing all the lessons, and (3) how they used the lessons. Responses to these areas were analyzed to determine relationships to their improvement scores on the five aspects of microwave cooking: (1) meal preparation, (2) application, (3) techniques, (4) utensils, and (5) principles. The relationships between respondents' attitudes and total improvement scores also were studied.

Table 5 shows relationships between respondents' attitudes about the microwave home study and their improvement scores.

Rating of Course

In general, homemakers who rated the course good or excellent had higher improvement scores than those who considered it to be only fair. Improvement scores on meal preparation and application were shown to be influenced by the way homemakers rated the course. While the improvement scores on techniques, utensils and principles tended to increase with higher ratings of the course, these differences were not significant at the .05 level. In meal preparation (F-value=4.2, $p=0.04$) and application (F-value=3.5, $p=0.06$) the relationship between the respondents' improvement scores and their rating of the course were determined to be significant by the analysis of variance F-test.

TABLE 5

RELATIONSHIPS BETWEEN HOMEMAKERS' ATTITUDES ABOUT THE
MICROWAVE HOME STUDY AND THEIR IMPROVEMENT SCORES

Attitudes	Improvement Scores					Total Improvement Score
	Meal Preparation	Application	Techniques	Utensils	Principles	
Rating of Course						
	--- Mean Score ---					
Fair (n=11)	-0.7	0.9	0.9	0.3	0.6	2.0
Good (n=50)	0.6	4.5	1.2	0.7	2.4	9.3
Excellent (n=66)	1.1	4.9	1.2	1.0	3.7	12.2
F-value	4.5	3.2	0.1	1.0	2.9	5.8
P	0.01	0.04	0.91	0.38	0.06	0.00
Reasons for Not Completing						
Course Delayed						
No (n=122)	0.8	4.4	1.1	0.9	3.0	10.3
Yes (n=5)	0.2	3.6	1.6	0.2	1.4	7.0
F-value	0.4	0.1	0.3	0.7	0.6	0.5
P	0.54	0.72	0.60	0.39	0.45	0.46
Lack of Time						
No (n=50)	0.8	6.6	1.3	1.1	4.4	14.4
Yes (n=77)	0.7	2.9	1.0	0.6	2.0	7.4
F-value	0.2	19.7	0.8	3.0	9.0	17.2
P	0.65	0.00	0.38	0.09	0.00	0.00
Family Obligations						
No (n=71)	1.1	5.1	1.2	0.9	2.8	11.0
Yes (n=56)	0.3	3.5	1.1	0.8	3.1	9.0
F-value	4.2	3.5	0.2	0.1	0.2	1.3
P	0.04	0.06	0.69	0.73	0.70	0.26
Loss of Interest						
No (n=123)	0.7	4.4	1.1	0.8	2.9	10.1
Yes (n=4)	0.5	4.3	2.0	2.0	3.5	12.3
F-value	0.1	0.0	0.8	2.1	0.1	0.2
P	0.81	0.95	0.38	0.15	0.79	0.66
Too Complicated						
No (n=121)	0.8	4.5	1.2	0.9	3.0	10.4
Yes (n=6)	-0.2	2.2	0.8	0.3	1.5	4.7
F-value	1.3	1.3	0.2	0.6	0.6	2.02
P	0.26	0.26	0.69	0.46	0.43	0.16
Too Easy						
No (n=126)	0.8	4.4	1.2	0.8	2.9	10.1
Yes (n=1)	-1.0	9.0	0.0	1.0	6.0	15.0
F-value	0.8	0.9	0.3	0.0	0.5	0.25
P	0.38	0.35	0.56	0.92	0.49	0.62
Too Involved						
No (n=116)	0.8	4.5	1.2	0.8	3.1	10.6
Yes (n=11)	0.4	2.8	0.7	1.2	0.9	6.0
F-value	0.4	1.2	0.6	0.5	2.4	2.2
P	0.52	0.27	0.46	0.46	0.12	0.14
Cost						
No (n=116)	0.7	4.6	1.2	0.8	3.2	10.5
Yes (n=11)	1.1	2.0	1.1	0.9	-0.4	5.9
F-value	0.4	2.9	0.0	0.0	6.6	2.1
P	0.55	0.09	0.92	0.86	0.01	0.15
Recipes						
No (n=118)	0.7	4.5	1.1	0.8	3.1	10.2
Yes (n=9)	1.6	2.7	1.7	0.9	1.1	9.8
F-value	1.7	1.2	0.7	0.0	1.6	0.0
P	0.19	0.28	0.41	0.91	0.21	0.90

TABLE 5 (continued)

Attitudes	Improvement Scores					Total Improvement Score
	Meal Preparation	Application	Techniques	Utensils	Principles	
--- Mean Score ---						
<u>How Used Lessons</u>						
<u>Used and Returned</u>						
No (n=69)	0.7	2.9	1.2	0.6	2.0	7.6
Yes (n=58)	0.8	6.2	1.1	1.2	4.0	13.2
F-value	0.2	15.5	0.3	4.2	6.3	11.3
P	0.65	0.00	0.61	0.04	0.01	0.00
<u>Used but not Returned</u>						
No (n=60)	0.4	5.8	1.0	1.1	3.4	11.7
Yes (n=67)	1.1	3.1	1.3	0.6	2.5	8.7
F-value	3.8	10.2	0.5	3.1	1.3	3.0
P	0.05	0.00	0.47	0.08	0.25	0.09
<u>Tried New Foods</u>						
No (n=26)	-0.5	1.6	0.6	0.7	0.6	3.2
Yes (n=101)	1.0	5.1	1.3	0.9	3.5	11.8
F-value	11.6	11.6	2.5	0.4	9.4	17.3
P	0.00	0.00	0.12	0.56	0.00	0.00
<u>Completed Experiments</u>						
No (n=57)	0.5	2.5	0.9	0.6	1.8	6.5
Yes (n=70)	1.0	5.9	1.4	1.0	3.8	13.1
F-value	1.9	17.4	2.3	1.2	6.3	15.6
P	0.17	0.00	0.13	0.28	0.01	0.00
<u>Changed Cooking Practice</u>						
No (n=52)	0.5	2.9	1.0	0.6	1.8	7.0
Yes (n=75)	0.9	5.5	1.3	1.0	3.7	12.3
F-value	0.8	9.0	0.7	1.7	5.5	9.3
P	0.37	0.00	0.42	0.20	0.02	0.00
<u>Learned New Techniques</u>						
No (n=20)	-0.2	1.4	1.0	0.6	0.6	3.4
Yes (n=107)	0.9	5.0	1.2	0.9	3.4	11.4
F-value	4.9	9.3	0.2	0.4	6.8	12.7
P	0.03	0.00	0.62	0.51	0.01	0.00
<u>Read Lessons</u>						
No (n=21)	-0.4	2.3	0.6	0.4	0.5	4.1
Yes (n=106)	0.9	4.8	1.3	0.92	3.4	11.3
F-value	7.4	4.5	2.2	1.8	7.4	10.0
P	0.01	0.04	0.14	0.18	0.01	0.00
<u>Kept to Read Later</u>						
No (n=26)	0.2	5.7	0.7	0.9	2.1	9.5
Yes (n=101)	0.9	4.1	1.3	0.8	3.1	10.3
F-value	2.6	2.3	1.8	0.0	1.1	0.2
P	0.11	0.13	0.18	0.84	0.29	0.70
<u>Filed for Reference</u>						
No (n=11)	-0.1	3.1	0.5	1.2	3.1	7.8
Yes (n=113)	0.9	4.5	1.2	0.8	3.0	10.6
F-value	2.4	0.8	1.2	0.5	0.0	0.8
P	0.12	0.36	0.27	0.48	0.96	0.36

When the total improvement scores were analyzed with the respondents ratings of the course, it was shown that respondents who had higher improvement scores also rated the course higher. Respondents who rated the course fair scored 2.0, those who rated it good scored 9.3, and those who rated it excellent scored 12.2. These observed differences were shown to be significant when analyzed by the variance of analysis F-test (F-value=5.8, $p=0.000$).

Reasons for Not Completing Course

Course delayed. The fact that the course was delayed from its planned starting date was given as a reason for not completing all the lessons by only 5 of the 128 respondents. It was not shown to have a significant relationship to respondents' improvement scores when tested by the analysis of variance F-test.

Lack of time. Lack of time was given as a reason for not completing the course by the majority of the homemakers (yes = 77, no = 50). When tested by the analysis of variance F-test this was shown to be significantly related to improvement scores in application (F-value=4.2, $p=0.04$) and principles (F-value=9.0, $p=0.000$) as well as the total improvement scores (F-value=17.2, $p=0.000$).

Family obligations. Family obligations did not interfere with completing the course for most of the homemakers (yes = 56, no = 71). Homemakers who cited family obligations as a reason for not completing the course had lower improvement scores in meal preparation.

This was shown to be significant at the .05 level when tested by the analysis of variance F-test ($F\text{-value}=4.2$; $p=0.04$). Family obligations were not related to improvement scores in any other area.

Loss of interest. Very few of the respondents indicated that loss of interest was a reason for not completing the course (no = 123, yes = 4). This was not shown to have a significant relationship to respondents' improvement scores when tested by the analysis of variance F-test.

Too complicated. Most of the respondents did not feel that the course was too complicated to complete (no = 121, yes = 6). The ones who did not complete the course because it was too complicated had lower improvement scores in all areas. However, these observed differences were not shown to be significant at the .05 level.

Too easy. Only 1 of the 128 homemakers did not complete the course because they felt it was too easy. This did not show a significant relationship to any area of improvement scores by the analysis of variance F-test.

Too involved. The majority of homemakers did not feel the course was too involved to complete (no = 116, yes = 11). When tested by the analysis of variance F-test this reason was not significantly related to improvement scores in any area.

Cost. The cost of the home study course did not affect completing the course for most of the homemakers (no = 116, yes = 11). Those who

did cite cost as a reason for not completing the course had significantly lower improvement scores on principles when tested by the analysis of variance F-test ($F\text{-value}=6.6$, $p=0.01$). This was not a significant relationship to improvement scores in any other area.

Recipes. Only 9 of the 128 homemakers did not complete the course because they didn't like the recipes. There were no significant relationships to any of the improvement scores when tested by the analysis of variance F-test.

How Used Lessons

Used and returned. In general, the homemakers who used and returned most of the lessons had higher improvement scores than those who did not. Improvement scores on application ($F\text{-value}=6.2$, $p=0.00$) and principles ($F\text{-value}=6.3$, $p=0.01$) were shown to be significantly influenced by whether or not the homemakers used and returned the lessons.

The total improvement score of those who used and returned the lessons was significantly higher than those who did not ($F\text{-value}=11.2$, $p=0.00$).

Used but not returned. About half of the homemakers said they used the lessons but did not return them. Surprisingly the homemakers who used the lessons without returning them had higher improvement scores on meal preparation. This was determined to be a significant relationship when tested by the analysis of variance F-test

(F-value=3.8, $p=0.05$). Conversely, this same group of homemakers had significantly lower improvement scores on application (F-value=10.2, $p=0.05$). No other relationships were significant.

Tried new foods. The homemakers who tried new foods as recommended in the lessons had higher improvement scores. The relationships between trying new foods and improvement scores was found to be significant in meal preparation (F-value=11.6, $p=0.00$), application (F-value=10.2, $p=0.00$) and total improvement scores (F-value=17.3, $p=0.00$). While the improvement scores on techniques and utensils increased for those who tried new foods these differences were not significant at the .05 level.

Completed experiments. More than half the homemakers indicated they had completed the experiments in the lessons. Homemakers who completed the experiments had higher improvement scores. When tested by the analysis of variance, completing the experiments was found to be significantly related to application (F-value=17.4, $p=0.00$), principles (F-value=6.3, $p=0.01$) and total improvement scores (F-value=15.6, $p=0.00$).

Changed cooking practice. Homemakers who changed cooking practices after taking the course had higher improvement scores. While there was an increase in improvement scores in meal preparation, techniques and utensils these differences were not significant at the .05 level. When tested by the analysis of variance F-test it was

shown that changing cooking practices was significantly related to improvement scores in application (F-value=9.0, $p=0.00$), principles (F-value=5.5, $p=0.02$) and total improvement score (F-value=9.3, $p=0.00$).

Learned new techniques. Respondents who reported learning new techniques from the home study course had higher improvement scores. Learning new techniques was determined to be significantly related to improvement scores in meal preparation (F-value=4.9, $p=0.03$), application (F-value=9.3, $p=0.00$), principles (F-value=6.8, $p=0.01$) and total improvement score (F-value=12.7, $p=0.00$).

Read lessons. The majority of homemakers said they read the lessons. Improvement scores in all areas were higher for those who read the lessons. When tested by the analysis of variance F-test it was shown that reading the lessons was significantly related to meal preparation (F-value=4.5, $p=0.01$), application (F-value=7.4, $p=0.01$), principles (F-value=7.4, $p=0.01$) and total improvement scores (F-value=10.0, $p=0.00$).

Kept to read later. Homemakers who kept the lessons to read later did not show any significant increase in improvement scores. When tested by the analysis of variance F-test the difference in each area studied was not significant at the .05 level.

Filed for reference. There was some increase in improvement scores for homemakers who filed the lessons for reference. This was

not determined to be a significant factor for any area studied when tested by the analysis of variance F-test.

Discussion

Most of the homemakers rated the course good or excellent. The more the homemakers liked the course the higher their improvement scores.

Lack of time and family obligations were the reasons most often cited for failure to complete the course. Homemakers who did not have time to complete the course had significantly lower improvement scores in application, principles and total improvement scores. A relationship was shown between family obligations as a reason for not completing and improvement scores in meal preparation. Homemakers who did not complete the course because of cost involved in trying the recipes and experiments did not improve on principles or their understanding of how a microwave oven works.

The major ways in which the home study course lessons were used by homemakers were: (1) filed for reference, (2) learned new techniques, (3) read the lessons, (4) tried new foods, and (5) kept to read later. The way homemakers used the lessons was shown to be significantly related to their improvement in meal preparation, application and principles.

Keeping the lessons to read later and filing them for reference was not related to improvement scores in any aspect of microwave cooking studied.

The way the homemakers used the lessons was significantly related to their total improvement scores. Homemakers who indicated they: (1) used and returned the lessons, (2) tried new foods recommended in the lessons, (3) completed the experiments, (4) changed their cooking practices, (5) learned new techniques, and (6) read the lessons, had significantly higher total improvement scores. There was no relationship between total improvement and homemakers who indicated the passive use of the lessons: (1) used but not returned, (2) kept to read later, and (3) filed for reference.

Active involvement in the microwave home study course clearly lead to effective learning. Many homemakers indicated they used the information in the lessons even though they did not complete the course.

CHAPTER VI

SUMMARY OF MAJOR FINDINGS

1. PURPOSES AND SPECIFIC OBJECTIVES

The major purposes of this study were to: (1) determine the effectiveness of the microwave home study course as a teaching method for Extension education in Sullivan County, Tennessee, and (2) determine target audiences for which the home study instruction is an acceptable teaching method.

Specific Objectives

The specific objectives of the study were:

1. To determine relationships between characteristics of homemakers and their levels of participation.
2. To determine relationships between characteristics of homemakers and number of lessons they completed.
3. To determine relationships between the number of lessons completed by homemakers and their pretest, post-test and improvement scores.
4. To compare pretest and post-test scores on five microwave use areas.
5. To determine relationships between homemakers' attitudes about the microwave home study and their improvement scores.

The study was undertaken in order to better understand the impact of Extension home study courses. It is hoped that Extension Home Economists will use this information in planning and implementing home study instruction for their clientele.

2. METHOD OF INVESTIGATION

A pretest and post-test were used to study responses of the 327 homemakers who participated in the microwave home study course offered in Sullivan County, Tennessee. The course used was an eight-lesson microwave home study instruction developed by the Housing and Equipment Specialist of the University of Tennessee Extension Service.

3. METHOD OF ANALYSIS

Data collected on the pretests and post-tests were coded and recorded on data processing cards for computation at the University of Tennessee Computer Center. Information was tabulated and frequency counts were made. The analysis of variance F-test was used to determine: (1) relationships between characteristics of homemakers and number of lessons completed, (2) relationships between the number of lessons completed by homemakers and their pretest, post-test and improvement scores, and (3) relationships between homemakers' attitudes about the microwave home study and their improvement scores. The chi square was used to determine the relationships between characteristics of homemakers and their levels of participation. The analysis of variance T-test was selected to compare pretest and post-test scores

on five microwave use areas. A probability level of .05 was accepted as being statistically significant.

4. MAJOR FINDINGS REGARDING INFLUENCE OF CHARACTERISTICS
OF HOMEMAKERS ON LEVELS OF PARTICIPATION AND
NUMBER OF LESSONS COMPLETED

Relationships Between Characteristics of Homemakers
and Levels of Participation

Personal and family characteristics.

1. The homemakers' age was not significantly related to levels of participation in the course.
2. The number in family did significantly influence the homemakers level of participation
3. The age of the youngest child did not significantly influence level of participation.
4. The number of years homemakers had owned a microwave oven was not significantly related to level of participation.

Extension contacts.

1. Whether or not homemakers belonged to Home Demonstration Clubs was not significantly related to their level of participation.
2. Attending Extension workshops did not significantly influence level of participation.

3. Receiving Extension newsletters was not significantly related to levels of participation.
4. Visiting the Extension office was not significantly related to homemakers levels of participation.
5. Calling the Extension office was not significantly related to levels of participation.
6. More homemakers who had received Extension information by radio, television or newspaper were active participants in the home study course. This relationship was significant.

Relationships Between Characteristics of Homemakers and Number of Lessons Completed

Personal and family characteristics.

1. The homemakers' age did not significantly influence the number of lessons completed.
2. The number in family was not significantly related to the number of lessons completed.
3. Homemakers with pre-school age children at home completed the most lessons. Homemakers with school age children at home completed the least number of lessons. This relationship was significant.
4. Education of the homemaker did not significantly influence number of lessons completed.

5. The years the homemakers had owned a microwave was not significantly related to the number of lessons completed.

Extension contacts.

1. Whether or not the homemaker was an HDC member did not significantly influence the number of lessons completed.
2. Attending workshops did not significantly influence the number of lessons completed.
3. Receiving newsletters was not significantly related to the number of lessons completed.
4. Visiting the Extension office did not significantly influence the number of lessons completed.
5. Homemakers who had called the Extension office completed significantly more lessons than those who had not.
6. Receiving Extension information by radio, television or newspaper was not significantly related to number of lessons completed.

Relationships Between the Number of Lessons Completed
by Homemakers and Their Pretest, Post-Test and
Improvement Scores

Meal preparation.

1. Pretest scores were not significantly related to number of lessons completed.
2. Post-test scores on meal preparation did not significantly influence number of lessons completed.

3. The improvement scores on meal preparation were not significantly related to number of lessons completed.

Application.

1. Number of lessons completed was not significantly influenced by pretest scores on application.
2. Homemakers who scored higher on post-test questions about application completed more lessons. This was a significant relationship.
3. The higher the improvement score on application, the more lessons the homemaker had completed. This was a significant relationship.

Techniques.

1. Pretest scores on techniques did not significantly influence number of lessons completed.
2. Post-test scores on techniques were not significantly related to number of lessons completed.
3. There were no significant relationships between improvement scores on techniques and number of lessons completed.

Utensils.

1. Pretest scores on utensils was not significantly related to number of lessons completed.
2. Homemakers who completed more lessons had significantly higher post-test scores on utensils.

3. The improvement scores on utensils was not significantly related to number of lessons completed.

Principles.

1. Pretest scores on principles were not significantly related to the number of lessons completed.
2. Homemakers who completed the most lessons had significantly higher post-test scores on principles. This was a significant relationship.
3. A high improvement score on principles of microwave cooking was significantly related to the number of lessons completed.

Total improvement scores.

1. Homemakers with higher total improvement scores completed significantly more lessons.

5. MAJOR FINDINGS REGARDING INFLUENCE OF SELECTED FACTORS ON HOMEMAKERS' IMPROVEMENT SCORES

Comparison of Pretest and Post-Test Scores

on Five Microwave Use Areas

1. Homemakers increased the number of ways the microwave oven was used in meal preparation after participating in the home study course. Scores on meal preparation increased significantly from pretest to post-test.
2. Homemakers used more applications of the microwave after participating in the home study course. Application scores increased significantly from pretest to post-test.

3. Homemakers increased the number of recommended techniques after participating in the home study course. Post-test scores on techniques had significantly increased from pretest scores.
4. Homemakers used more recommended utensils after participating in the home study course. Scores on utensils used increased significantly from pretest to post-test.
5. Homemakers gained a better understanding of microwave principles after participating in the home study course. Scores on principles increased significantly from pretest to post-test.

Relationships Between Homemakers' Attitudes About
the Microwave Home Study and Their Improvement Scores

Ratings of course.

1. Homemakers who rated the course higher had significantly higher improvement scores on meal preparation and application.
2. There were no significant relationships between ratings of course and improvement scores on techniques, utensils and principles.
3. Homemakers who had rated the course higher had higher total improvement scores. This was a significant relationship.

Reasons for not completing.

1. The course being delayed from its planned starting date did not significantly influence homemakers' improvement scores.
2. Homemakers who did not complete the course because of lack of time showed significantly less improvement in application, principles, and total improvement scores.
3. Homemakers who did not complete the course because of family obligations showed significantly less improvement in meal preparation. Family obligations were not shown to be significantly related to improvement scores in any other area.
4. Loss of interest as a reason for failure to complete was not significantly related to homemakers' improvement scores in any area.
5. Not completing the course because it was too complicated was not significantly related to improvement scores in any area.
6. Failure to complete the course because it was too easy was not significantly related to homemakers' improvement scores.
7. Not completing the course because it was too involved was not significantly related to improvement scores in any area.

8. Homemakers who did not complete the course because of the cost involved had significantly lower improvement scores on principles. There was not a significant relationship to improvement scores in any other area.
9. Failure to complete the course because they did not like the recipes was not significantly related to any of the homemakers' improvement scores.

How used lessons.

1. Homemakers who used and returned the lessons had significantly higher improvement scores on application, principles and total improvement scores.
2. Homemakers who used the lessons but did not return them had significantly lower improvement scores on application and significantly higher improvement scores on meal preparation.
3. Homemakers who tried new foods as recommended in the lessons had significantly higher improvement scores in meal preparation, application and total improvement scores.
4. Homemakers who completed the experiments had significantly higher improvement scores in application, principles and total improvement scores.
5. Changing cooking practices after taking the course was significantly related to higher improvement scores in application, principles, and total improvement scores.

6. Homemakers who indicated they learned new techniques showed significant improvement in meal preparation, principles and total improvement scores.
7. Improvement scores in meal preparation, application, principles and total improvement scores were significantly higher for homemakers who read the lessons.
8. Homemakers who kept the lessons to read later did not show any significant increase in improvement scores.
9. Homemakers who filed the lessons for reference did not show any significant increase in improvement scores.

6. IMPLICATIONS AND RECOMMENDATIONS

The following implications and recommendations are based on the researcher's opinions and attitudes.

1. Findings from this study indicate the majority of the participants in the microwave home study course are not traditional Extension clientele. Home study courses may be a very beneficial method for increasing public awareness of the Extension program. Extension agents should be concerned with expanding their audiences in order to attempt to meet the needs of all people. The home study course should be viewed as a good method of accomplishing this goal.
2. Results from this study show that the target audiences for the microwave home study courses are: (1) homemakers

in their mid-40's, (2) with some post high-school education, (3) with school age children, (4) with 3-4 family members, and (5) who have owned their microwave for about 2 years. This audience is younger than most traditional Extension homemakers' groups and had more years of education than might be expected of the general population. It should be recognized that because home study instruction involves reading and understanding written instruction, the disadvantaged section of the population will not participate in this method of instruction. It was, however, a well received method of instruction for young homemakers with young children at home, an audience that can benefit very much from the home economics information available through Extension education.

3. It can be seen from the study results that the homemakers who participated in the home study course did show improvement in both an understanding of the material, and trying and adopting new practices. As is true of any method of instruction, the more actively the homemakers participated in the course the more improvement they showed. To more effectively motivate participants to stay involved it is recommended the agents provide some follow-up to the home study course.
4. There is understandably some concern among Extension agents to the large drop-out rate involved with home study

instruction. Findings from this study show that respondents used the home study lessons whether or not they returned the assignment sheet with each lesson. It is suggested that agents send the lessons at some pre-determined time to all those enrolled instead of waiting for each lesson to be returned.

7. RECOMMENDATIONS FOR FURTHER STUDY

In addition to the findings presented in this thesis, it is recommended that study be done on home study courses in different home economic subject matter for comparisons. It is also recommended that this study be repeated in other counties. It would be interesting to know the differences in Extension home study instruction in urban versus rural counties.

Furthermore, it is recommended that further study be done on the cost/benefit of home study instruction as an alternate method of Extension teaching.

BIBLIOGRAPHY

BIBLIOGRAPHY

1. Boyce, Phyliss R. "Development and Testing of a Seven-Unit Series of Extension Money Management Newsletters with Selected Home Demonstration Club Members and Non-Members in Clay County, Tennessee." Unpublished Master's thesis, Knoxville: The University of Tennessee, 1977.
2. Disilvertro, Frank R. and Markowitz, Harold. "Contracts and Completion Rates in Correspondence Study," Journal of Extension Research, vol. 75, no. 4, March/April, 1982.
3. Dixon, Lois Claudine. "Characteristics of Viewers of a Tennessee Agricultural Extension Service Educational Television Series on Renovating Furniture." Unpublished Master's thesis, Knoxville: The University of Tennessee, 1973.
4. "Extension Teaching Methods," Food and Agriculture Organization of the United Nations, Rome, 1974.
5. Harper, William R. "The System of Correspondence," in MacKenzie, O. and Christensen, E. C. (eds.) The Changing World of Correspondence Study. University Park: Pennsylvania State University Press, 1971.
6. Holmberg, Borje. Status and Trends of Distant Education. New York, N.Y.: Nichols Publishing Co., 1981.
7. Hughes, Charles Ray. "The Influence of Some Selected Factors Upon the Completion of Correspondence Study Courses," Doctoral Dissertation. University of Florida, 1965.
8. Lauridsen, Ellen Rand. "The Determinants of Life Satisfaction Among Adults," Unpublished Master's thesis, Knoxville: The University of Tennessee, 1981.
9. Macken, E., et al. Home-Based Education: Needs and Technological Opportunities. Stanford, California: Stanford University, 1976.
10. Marshall, Charles B. "The Effectiveness of Home Study," LaSalle Extension University, Chicago, Ill., 1976. (ERIC Document Reproduction Service No. ED 163 884.)
11. McNeil, Don. "Implications for Change That the British Open University May Have Upon Traditional Higher Education Activities," Hawaii University, Honolulu. Leward Community College. (ERIC Document Reproduction Service No. ED 188 521.)

12. Read, Hadley. Communication: Methodss for All Media. Urbana, Chicago, London: University of Illinois Press, 1972.
13. Sabers, Darrell L. et al. "The Effects of Letters and Postcards of Encouragement on the Submission of Lessons in Correspondence Study. Journal of Experimental Education, vol. 42, no. 1, Fall, 1972.
14. Stephens, Doris. "Motivating Students in Correspondence Courses," Continum, vol. 43, no. 3, March 1979, p.27-28.
15. Wong, A. and Wong, S. C. P. "The Relationship Between Assignment Completion and the Attrition and Achievement in Correspondence Courses," Journal of Educational Research, vol. 72, no. 3, January/February, 1979, p.165-168.

APPENDICES

APPENDIX A

PRETEST

UNDERSTANDING AND USING YOUR MICROWAVE

- a home study course on microwave ovens and microwave cookery.

The following information is to determine your present knowledge and use of microwave cooking. We are trying to determine which areas you need information about and how effectively this course can meet those needs.

A. FAMILY SITUATIONAL INFORMATION

1. Name: _____
2. Address: _____

3. Age: _____
4. Number in family: _____; Age of youngest child: _____
5. Education: (highest grade or degree completed) _____
6. Have you ever had contact with the Agricultural Extension Service through any of the following methods (answer yes or no)
Attended workshops or classes? _____
Received newsletters? _____
Joined a Home Demonstration Club? _____
Visited the Extension Office? _____
Called the Extension Office? _____
Received Extension Information by Radio, TV, or Newspaper? _____
7. Do you have a microwave at home? _____
8. If no, do you have daily access to a microwave? _____

IF YOUR ANSWER TO QUESTION #8 WAS NO DO NOT COMPLETE THE REST OF THIS QUESTIONNAIRE.

B. MICROWAVE EXPERIENCE

1. how long have you had a microwave oven? _____

2. How have you used the following sources of information to learn about microwave cooking? (check degree of helpfulness for each)

	Very Helpful	Moderately Helpful	Somewhat Helpful	Not at all Helpful	Didn't Use
Personal Experimentation					
Microwave Cookbooks					
Commercial Demonstrations					
Classes or Courses					
From Friends or Relatives					
Others (please specify)					

3. Do you use your microwave for any of the following in meal preparation: (check degree of use for each)

	Nearly Always	Sometimes	Seldom	Never
For reheating leftovers				
For defrosting				
For complete meal				
In addition to conventional oven				
For individual steps in preparing recipes				

4. (a) On the average, how many times per day do you use your microwave? _____

(b) If less than once a day, how many times per week? _____

5. Have other members of your family used the microwave oven in the past week? (answer yes or no for each)

You? _____

Your spouse? _____

Children? _____

Other? (please specify) _____

C. MICROWAVE USE AND APPLICATION

1. Have you used your microwave to prepare any of the following: (answer yes or no)

meat? _____

bread? _____

fish? _____

noodles? _____

poultry? _____

rice? _____

canned vegetables? _____

cooked cereal? _____

- fresh vegetables? _____ cakes? _____
 frozen vegetables? _____ cookies? _____
 fruit? _____ candy? _____
 casseroles? _____ cheese recipes? _____
 eggs? _____ milk recipes? _____
2. Have you ever used your microwave for purposes other than cooking? (answer yes or no for each)
- drying herbs? _____ making dough ornaments? _____
 toasting nuts? _____ making play dough? _____
 making croutons? _____ blanching vegetables? _____
 rehydrate dried fruit? _____ making jams or jellies? _____
 drying flowers? _____ other? (please specify) _____
3. Do you normally use the following techniques to aid in uniform cooking? (answer yes or no) ✓
- Rotate dish during cooking time? _____
 Stir foods once or twice during cooking? _____
 Allow for standing or carryover time? _____
 Rearrange portions? _____
 Shield parts of dish? _____
 Cover dish? _____
4. Do you normally use the following practices in meal arrangement? (answer yes or no)
- Remove some dishes before cooking is completed, in order to use microwave for other dishes? _____
 Reduce portion sizes? _____
 Prepare some dishes ahead and reheat at meal time? _____
 Use both the microwave and conventional oven? _____
 Cook more than one dish in microwave at a time? _____
5. Do you use the following utensils in microwave cooking? (answer yes or no)
- Wooden spoon? _____ Tube pan? _____
 Plastic wrap? _____ Browning dish? _____
 Waxed paper? _____ Cooking Bags? _____
 Paper towels? _____ Individual casseroles? _____
 4-cup measure? _____

D. UNDERSTANDING MICROWAVE PRINCIPLES

1. When converting recipes to use in the microwave, do you use any of the following practices? (answer yes or no)

Reduce amount of moisture by $1/4$? _____

Eliminate browning steps? _____

Chop and cube to uniform pieces? _____

Salt meat after cooking instead of before? _____

Season sparingly? _____

Fill containers only $1/2$ to $3/4$ full? _____

Remove from oven before it "appears" done? _____

Reduce cooking time by $3/4$? _____

2. Microwave cooking is different from conventional cooking. Answer the following statements according to your present understanding of how they work. Don't worry about right or wrong answers--this is to see how much you know before taking the home study course. (answer yes or no).

a. Microwaves cook foods from the inside out. _____

b. Microwaves produce energy, not heat. _____

c. During standing time the food continues to cook as heat in the outer layer moves toward the cooler food in the center. _____

d. Microwaves only penetrate food to a depth of about $2-1/2$ to 3 inches. _____

e. Absorbing microwaves causes the molecules in food to move so rapidly they produce heat by friction. _____

f. Using a microwave for foods requiring long periods of cooking time saves energy. _____

g. When you double the amount of food, you nearly double the amount of cooking time. _____

h. Three or more cups of liquid can be heated faster on most surface units than in a microwave. _____

i. Foods which are sugary or fatty will heat slower than the rest. _____

j. There are amounts of foods which can be cooked conventionally in the same or less time than it takes to microwave. _____

k. With microwave cooking you can control time and power but not heat. _____

l. In defrosting, your microwave cycles on and off. _____

m. Standing time gives the food time to cool down before it is eaten. _____

3. Have you ever had any of the following unsatisfactory results?
(check degree of frequency of occurrence for each)

	Very Frequently	Frequently	Sometimes	Seldom	Never
Food "burst"					
Overcooked					
Undercooked					
Overcooked in some places, undercooked in others					
Too salty or too much seasoning					
Tough or stringy					
Took too long to cook					
Started cooking before completely defrosted					
Soggy					
Unappetizing appearance					

4. What foods do you have the most success with?

5. What foods do you have the least success with?

APPENDIX B

POST-TEST

September 22, 1983

To: Participants in Microwave Home Study Course

Dear Friend,

Thank you for taking part in the Microwave Home Study Course. I have appreciated all the comments and suggestions I have received about this course.

Please complete the following questionnaire to help me in evaluating the effectiveness of home study courses in Extension teaching programs. It's very important that I receive an evaluation from each student enrolled - whether or not you completed the course.

Thank you for your prompt attention to this matter.

Sincerely,

Mary Vickers Kelly
Assistant Extension Agent

MVK/rh

TENNESSEE AGRICULTURAL EXTENSION SERVICE

Microwave Home Study Course

Post-test

The following information is needed to help determine the effectiveness of the microwave home study course and who benefited most from this method of teaching.

Thank you for your cooperation.

A. FAMILY SITUATIONAL INFORMATION

Name _____ Address _____

1. Family Structure

_____ married, no children
_____ at home
_____ married, children at
_____ home
_____ single, no children
_____ at home
_____ single, children at
_____ home

2. Employment

_____ married, both employed
_____ married, one employed
_____ single, employed
_____ single, unemployed

3. Completion of Course

A. How would you rate the effectiveness of the home study course as a way of learning microwave cooking?

Excellent _____ Fair _____
Good _____ Poor _____

B. Did you complete all the lessons? _____

If no, what was the main reason? (check those that apply)

delay in starting the course? _____

lack of time _____

family obligations? _____

loss of interest? _____

course too complicated? _____

course too easy? _____

course too involved? _____

cost of experiments? _____

didn't like the recipes? _____

others (please specify) _____

- C. How have you used information from the lessons? (Answer yes or no)

Completed and returned most of the lessons _____
 Used information from lessons but did not return them _____
 Tried new food and recipes _____
 Completed experiments _____
 Changed cooking practices _____
 Learned new techniques _____
 Read lessons _____
 Kept lessons to read later _____
 Filed lessons for reference _____
 Other _____

The following questions will help evaluate what, if any, changes you have made since taking the home study course.

B. MICROWAVE EXPERIENCE

1. Do you use your microwave for any of the following in meal preparation: (check degree of use for each)

	Nearly Always	Sometimes	Seldom	Never
a. For reheating leftovers				
b. For defrosting				
c. For complete meal				
d. In addition to conventional oven				
e. For individual steps in preparing recipes				

2. a. On the average, how many times per day do you use your microwave? _____

3. a. Have members of your family used the microwave oven in the past week? (answer yes or no for each)

you? _____

your spouse? _____

children? _____

other? (please specify) _____

C. MICROWAVE USE AND APPLICATION

1. Have you used your microwave to prepare any of the following: (answer yes or no)

- a. meat? _____ j. breads? _____
 b. fish? _____ k. noodles? _____
 c. poultry? _____ l. rice? _____
 d. canned vegetables? _____ m. cooked cereal? _____
 e. fresh vegetables? _____ n. cakes? _____
 f. frozen vegetables? _____ o. cookies? _____
 g. fruit? _____ p. candy? _____
 h. casseroles? _____ q. cheese recipes? _____
 i. eggs? _____ r. milk recipes? _____
2. Have you used your microwave for any of these purposes? (answer yes or no for each)
- a. drying herbs? _____ f. making dough ornaments? _____
 b. toasting nuts? _____ g. making play dough? _____
 c. making croutons? _____ h. blanching vegetables? _____
 d. rehydrate dried fruit? _____ i. making jams or jellies? _____
 e. drying flowers? _____ j. other? (please specify) _____

3. Do you normally use the following techniques to aid in uniform cooking? (answer yes or no)
- a. Rotate dish during cooking time? _____
 b. Stir foods once or twice during cooking? _____
 c. Allow for standing or carryover time? _____
 d. Rearrange portions? _____
 e. Shield parts of dish? _____
 f. Cover dish? _____
4. Do you normally use the following practices in meal management? (answer yes or no)
- a. Remove some dishes before cooking is completed, in order to use microwave for other dishes? _____
 b. Reduce portion sizes? _____
 c. Prepare some dishes ahead and reheat at meal time? _____
 d. Use both the microwave and conventional oven? _____
 e. Cook more than one dish in microwave at a time? _____
5. Do you use the following utensils in microwave cooking? (answer yes or no).
- a. Wooden spoon? _____ f. Tube pan? _____
 b. Plastic wrap? _____ g. Browning dish? _____
 c. Waxed paper? _____ h. Cooking Bags? _____
 d. Paper towels? _____ i. Individual casseroles? _____
 e. 4-cup measure? _____

D. UNDERSTANDING MICROWAVE PRINCIPLES

1. When converting recipes to use in the microwave, do you use the following practices? (answer yes or no)
 - a. Reduce amount of moisture by 1/4? _____
 - b. Eliminate browning steps? _____
 - c. Chop and cube to uniform pieces? _____
 - d. Salt meat after cooking instead of before? _____
 - e. Season sparingly? _____
 - f. Fill containers only 1/2 to 3/4 full? _____
 - g. Remove from oven before it "appears" done? _____
 - h. Reduce cooking time by 3/4? _____

2. Microwave cooking is different from conventional cooking. Please answer yes or no to the following statements according to your present understanding of microwave cooking:

a. Microwaves cook foods from the inside out. _____ b. Microwaves produce energy, not heat. _____ c. During standing time the food continues to cook as heat in the outer layer moves toward the cooler food in the center. _____ d. Microwaves only penetrate food to depth of about 2-1/2 to 3 inches. _____ e. Absorbing microwaves causes the molecules in food to move so rapidly they produce heat by friction. _____ f. Using a microwave for food requiring long periods of cooking times saves energy. _____	g. When you double the amount of food, you nearly double the amount of cooking time. _____ h. Three or more cups of liquid can be heated faster on most surface units than in a microwave. _____ i. Foods which are sugary or fatty will heat slower than the rest. _____ j. There are amounts of foods which can be cooked conventionally in the same or less time than it takes in microwave. _____ k. With microwave cooking you can control time and power but not heat. _____ l. In defrosting, your microwave cycles on and off. _____ m. Standing time gives the food time to cool down before it is eaten. _____
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3. Have you ever had any of the following unsatisfactory results?
(check degree of frequency of occurrence for each)

	Very Fre- quently	Fre- quently	Some- times	Seldom	Never
a. Food "burst"					
b. Overcooked					
c. Undercooked					
d. Overcooked in some places, undercooked in others					
e. Too salty or too much seasoning					
f. Tough or stringy					
g. Took too long to cook					
h. Started cooking before completely defrosted					
i. Soggy					
j. Unappetizing appearance					

4. What did you like most about the course?

5. What did you like least about the course?

Thank you for providing the above information. Please return this completed questionnaire as soon as possible in the enclosed envelope. We hope you enjoyed and benefited from the microwave home study course.

Mary Vickers Kelly
Assistant Extension Agent
P. O. Box 396
Blountville, Tennessee 37617
Phone 323-7173

VITA

Mary Vickers Clark, daughter of Mrs. Ruth T. Vickers and the late Roy O. Vickers, was born in Salisbury, North Carolina. She graduated from Graham High School in Bluefield, Virginia in May, 1970. She attended Bluefield Baptist College and Virginia Polytechnic Institute. She received a Bachelor of Science degree in 1974 in Clothing Textiles and Related Arts from the College of Home Economics at Virginia Polytechnic Institute.

Upon graduating, she worked as a commercial and residential interior designer and taught adult education classes in interior design in Kingsport, Tennessee. In November 1976 she accepted the position of 4-H agent with the Agricultural Extension Service in Sullivan County, Tennessee. In March, 1982 she transferred to the adult home economics position. She received the promotion to Associate Extension Agent in July, 1984, the position she currently holds.

She is a member of Gamma Sigma Delta, the national honorary Agricultural society, and Epsilon Sigma Phi, the national Extension fraternity.

She was married to Stephen George Clark on October 6, 1984. They live in Bristol, Tennessee.