NUTRITION EDUCATION: AN APPRAISAL OF TEACHING TECHNIQUES PLANNED FOR BEHAVIORAL CHANGE

A DISSERTATION

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE OF DOCTOR OF PHILOSOPHY IN HOME

ECONOMICS EDUCATION IN THE GRADUATE SCHOOL

OF THE TEXAS WOMAN'S UNIVERSITY

COLLEGE OF

HOUSEHOLD ARTS AND SCIENCES

BY

MARGARET ALEENE KING VAN DE GRIFT, B.S., M.A.

DENTON, TEXAS

AUGUST, 1972

Texas Woman's University

Denton, Texas

July 26 19 72

We hereby recommend that the dissertation prepared under our supervision by Margaret Aleene King Van de Grift entitled NUTRITION EDUCATION: AN APPRAISAL OF TEACHING TECHNIQUES PLANNED FOR BEHAVIORAL CHANGE

be accepted as fulfilling this part of the requirements for the Degree of Doctor of Philosophy

Committee:

Bernadine Johnson
Chairman
Jessie W Bateman
Betty B. Alford
Robert J Long
Alice N. Nielsen

Accepted:
Mary Evelyn Huey
Dean of Graduate Studies

A C K N O W L E D G M E N T S

It is a pleasure to express gratitude to those who have given guidance and support in the planning and development of this study and the completion of the dissertation:

To Dr. Bernadine Johnson, Assistant Professor of Home Economics Education, and chairman of the graduate committee, who directed the formation of the study and final editing of the manuscript;

To Dr. Jessie W. Bateman, Professor of Home Economics Education, who contributed ideas and assistance on presentation of data and aided in editing the manuscript;

To Dr. Betty B. Alford, Assistant Professor of Nutrition Research, who contributed ideas for the development of the study and gave assistance throughout the study;

To Dr. Alice N. Milner, Associate Professor of Nutrition, who has contributed valuable criticisms and encouragement throughout the study;

To Dr. Robert J. Sirny, Dean of the College of Household Arts and Sciences, for encouragement and serving on the graduate committee;

And to her husband, Dr. W. H. Van de Grift, without whose constant encouragement, cooperation, and patience this study could not have been accomplished.

TABLE OF CONTENTS

Chapter		Page
	ACKNOWLEDGMENTS	iii
	TABLE OF CONTENTS	iv
	LIST OF TABLES	viii
I	INTRODUCTION	1
	Purposes of the Study	7
II	REVIEW OF LITERATURE	8
	Food Practices Within the United States	10
	Adequacy of Diets	10
	Recent Changes in Household Diets	15
	Source of Food Nutrients	15
	Technological Advances	16
	Changes in Patterns of Living	18
	Reasons for Dietary Deficiencies	21
	Culture	21
	Ethnic Factors in Dietary Deficiency	23
	Socio-economic Factors in Dietary Deficiency	26
	Nutritional Status of Teenagers in the United States	28
	Causes for Concern	28
	Possible Causes of Deficient Diets	36
	Nutrition Education for the "Now" Generation	49
	Instructional Techniques and Devices	52
	Problems Related to Teaching of Nutrition	61
III	PROCEDURE	73
	The Sample for the Study	73
	The Instrument for the Study	74

Chapter		Page
	The Collection of Data	75
	Techniques of Data Analysis.	76
IV	PRESENTATION AND ANALYSIS OF DATA.	78
	Teacher Situation.	80
	Teaching Experience	80
	Academic Training	82
	College Courses Completed	84
	Professional Workshops or In-service Meetings	85
	Professional Magazines Read	86
	Grade Level of Teaching	86
	Need for Improved Eating Habits . .	87
	Research Regarding Dietary Patterns	87
	Stimulation of Students	89
	Use of Teaching Aids.	90
	Use of Real Life Experiences. . . .	93
	Simulations of Reality.	97
	Abstractions from Reality	101
	Individualized Instruction.	105
	Summary of Four Classifications of Teaching Techniques	109
	Statistical Analysis of Data	111
	Teaching Experience	112
	Attendance at Workshops or In-service Meetings.	113
	Professional Magazines.	120
	College Nutrition Courses Completed.	125
	College Foods Courses Completed . .	126
	Use of Real Life Experiences as Teaching Techniques.	127
	Use of Simulations of Reality for Teaching Techniques.	128
	Use of Abstractions from Reality for Teaching Techniques.	129
	Individualized Instruction	130
	Total Use of Teaching Techniques. .	131
V	SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS.	133
	BIBLIOGRAPHY	148

Page

APPENDICES 158

Appendix A. 159
Appendix B. 161
Appendix C. 163
Appendix C. 165

LIST OF TABLES

Table		Page
I	TEACHING EXPERIENCE AS REPORTED BY 160 HOME ECONOMICS TEACHERS IN SECONDARY SCHOOLS	81
II	EDUCATIONAL BACKGROUND OF 160 HOME ECONOMICS TEACHERS IN SECONDARY SCHOOLS	83
III	INFORMATION CONCERNING NUTRITION AS REPORTED BY 160 HOME ECONOMICS TEACHERS IN SECONDARY SCHOOLS	88
IV	USE OF AUDIO-VISUAL DEVICES BY 160 HOME ECONOMICS TEACHERS IN THE SECONDARY SCHOOL. . .	91
V	EFFECTIVENESS OF TEACHING TECHNIQUES (GROUP I) USED BY 160 HOME ECONOMICS TEACHERS IN SECONDARY SCHOOLS	94
VI	EFFECTIVENESS OF TEACHING TECHNIQUES (GROUP II) USED BY 160 HOME ECONOMICS TEACHERS IN SECONDARY SCHOOLS	98
VII	EFFECTIVENESS OF TEACHING TECHNIQUES (GROUP III) USED BY 160 HOME ECONOMICS TEACHERS IN SECONDARY SCHOOLS	102
VIII	EFFECTIVENESS OF TEACHING TECHNIQUES (GROUP IV) USED BY 160 HOME ECONOMICS TEACHERS IN SECONDARY SCHOOLS	106
IX	EFFECTIVENESS OF FOUR GROUPS OF TEACHING TECHNIQUES USED BY 160 HOME ECONOMICS TEACHERS IN SECONDARY SCHOOLS.	110
X	CORRELATIONS BETWEEN THE USE OF TEN SELECTED VARIABLES	114
XI	ANALYSES OF VARIANCE FOR TOTAL TEACHING EXPERIENCE AND NINE SELECTED VARIABLES.	117
XII	ANALYSES OF DIFFERENCES BETWEEN THREE LEVELS OF TEACHING EXPERIENCE AND NINE SELECTED VARIABLES	121

CHAPTER I

I N T R O D U C T I O N

Harper (44) defined nutrition as the part of the science of biology concerned with the study of food and its relation to health. The practice of nutrition is concerned with the application of knowledge obtained through the science of nutrition for attaining optimum health for mankind. Parrish (75) reviewed food habits within the United States and stated that the achievement of optimum health has been affected by changes in the life styles of the average citizen within the United States. Increased urbanization, greater mobility, and new modes of living are associated with changes in food habits. Many of the changes have adversely affected the nutritional status of the population.

The 1964 School Health Education Study (87) revealed a disparity between knowledge and practice of nutrition. Today's adolescent has been exposed to the study of nutrition from elementary through secondary school, yet inadequate dietary practices of adolescents exist. Hampton and associates (42) have reported numerous studies which document the prevalence of adolescent nutritional deficiencies. Obviously, instruction has not been successful in implementing nutritional knowledge with nutritional practice.

Harper (44) advanced the theory that recent developments in the field of nutrition are responsible for many of the nutritional problems. Surveys by Litman (57) indicate that the food attitudes and food preferences of young people are largely determined by the nutritional knowledge of their mothers. Since the nutritional information is so recent, the knowledge of mothers is not widely diffused. Morse and associates (72) investigated the extent of nutritional knowledge of a group of 238 mothers and found that only 22 mothers had studied nutrition as a part of a home economics program. Sixteen had studied nutrition through nursing programs.

Burgess (15) concluded that psychological, sociological and cultural factors created barriers against rapid changes in food habits. Scientific knowledge alone cannot bring about the needed improvement. People must want to use the information, know how to use it, and be willing to make the needed changes in eating habits. Educators are seeking new techniques to achieve improved nutritional attitudes and practices. Sinacore (90) reported that the 1969 White House Conference on Food, Nutrition, and Health considered the need for nutrition education in the schools and stated that a dynamic nutrition education program should begin in early childhood and continue through the elementary and secondary schools. Inasmuch as nutrition education in some form is

already included in public school curriculums, the major need at the present time is for an innovative educational program that will be accepted and followed. The study by Morse (72) suggested that adult programs should be included.

Balsey and associates (7) suggested relating nutrition to other factors involved in the total physical, mental, and social development of the adolescent. Hammer (41) suggested an interdisciplinary approach to the health problems of adolescents. In the school situation, this could involve all persons who are professionals in nutrition and health education. Marqusee (66) expressed interest in the incorporation of nutrition education within the whole realm of ecological balance. Since health is a problem of sanitation, of food supply and consumption and of disease treatment, a massive education program is indicated.

Food habits and eating belong to today's most cherished aspects of life. Educators assert that changing food consumption by education is no easy task. Spindler (94) studied the eating behavior of a group of college freshmen and concluded that nutrition education had not significantly changed their eating patterns. The challenge is greater since the students reported having been exposed to nutritional instruction an average of five times.

Behavioral psychologists have suggested some changes in the techniques for nutritional education. Vargas (106) recommended emphasizing what the students are doing instead of what the teacher is doing. Teachers are challenged to stop talking about content and start emphasizing goals to be attained by the student. Mere mastery of content has not produced desired changes. Harker and Kupsinel (43) expressed the opinion that there is a need for college courses that are specifically keyed to the problems the high school teacher faces when teaching nutrition. New techniques which necessitate student participation should be included in such a program. Ack (1) stated that the use of dull and tedious methods of teaching result in students who fail to learn. As a behavioral scientist, Ack asserted that the essential characteristics of an effective learning situation are often totally ignored. Leverton (56) warned against the use of "scare" techniques in teaching nutrition since adolescents are not experiencing the nutritional disaster that adults have told them will result from poor food habits. Finley (33) stated: "It is a known fact that students learn and retain to a greater degree when they are involved in the learning." Educators need to seek new and stimulating ways to involve students.

Aldrich (3) expressed a need for research in the behavioral aspects which furnish the background for food habits, their formation, and their vulnerability to change. The behavioral scientist and nutritionist would work together as a team. Ringis (80) recommended numerous changes in the educational process. Reliance on behaviorally stated objectives is considered essential to self-directed learning and continuous progress by the students. Forness (35) affirmed that the behavioristic approach has been too limited, and has encouraged all classroom teachers to use this technique. Effective techniques include reinforcement, conditioning approaches and research methods applied to behavior.

Burgess (15) concluded that within recent years attention has been focused more and more on the techniuqes of instruction as well as the attitudes of students toward the subject. Dwyer and associates (25) investigated the attitudes toward nutrition education and knowledge of nutrition among high school students in a metropolitan area. Results of the study showed that the majority of students considered nutrition to be equally or less interesting than other parts of health education courses they had taken. Reasons advanced for the indifferent attitude toward nutrition were: 1) subject matter was boring; 2) material had previously been presented at lower levels; 3) most of the learning involved

memorizing "useless" facts and technical vocabulary rather than giving a real understanding and discussion of the principles involved; 4) material was taught at too low a level and covered in a superficial manner; and 5) the teacher appeared to be uninterested in nutrition and consequently presented material poorly and in a dull manner.

Data from the study by Dwyer (25) reported the most uninteresting topics in nutrition classes were: calories, nutrient composition of foods, detailed discussions of the vitamins, the anatomy of digestion and absorption, and overemphasis on the Basic Four Food Groups. The overall conclusion was that the students had not been putting into practice the nutritional knowledge they had acquired and were not interested in the subject to any appreciable extent. These findings were similar to those obtained from high school students in Tennessee, studied by Orr (74), and secondary school students in Arkansas, studied by Dowell (24).

Innovational and motivational approaches to achieve behavioral change have been stressed in several workshops at the university level. Group projects have been planned and executed to provide help for teachers seeking new techniques. Many professional journals and magazines have published articles regarding new approaches to the teaching of nutrition.

In view of the many discussions and new types of instructional material, a need exists for a study whose purpose would be to evaluate recommended techniques and to ascertain the extent to which homemaking teachers in secondary schools are using them.

PURPOSES OF THE STUDY

The first general objective was to present and evaluate some innovative techniques of teaching nutrition. The second was to survey instructional practices of a group of randomly selected secondary school homemaking teachers. Specific objectives of the study were to determine:

1) Whether or not teachers of secondary school nutrition are employing a variety of teaching techniques which stress behavioral changes related to food selection;

2) Which teaching techniques and devices are demonstrated to be the most effective toward achieving behavioral change;

3) The effectiveness of teaching and learning in real life situations;

4) The effectiveness of simulations of reality for teaching and learning;

5) The effectiveness of abstractions from reality for teaching and learning; and

6) The effectiveness of individualizing instruction for teaching and learning.

CHAPTER II

REVIEW OF LITERATURE

Food practices in the United States have been receiving increased attention within recent years. Claims have been made that as many as 10 million people are underfed or undernourished. The degree of dietary deficiencies is not always agreed upon, but there is general agreement concerning the discrepancies between availability of food and the wise use of food. Most people involved in health education agree that there is an urgent need in the nation for a nutrition education program aimed at enabling people to combat existing hunger and malnutrition. Eppright (28) explained very simply the problem of food selection by stating that people are born with a drive to eat when hungry but are not born with the instinctive urge to select foods to meet individual nutritional needs.

Food practices of young adults and teenagers seem to present the greatest concern to those charged with the responsibility of improving the health of the population as a whole. Numerous studies indicate the seriousness of the dietary inadequacies within this age group. Irregular eating patterns and widespread use of poorly chosen snack foods have become a

way of life for most teenagers. Since food practices often reflect past training, these young people may very well represent practices used to train a new generation.

All forms of media have been utilized to sell the consumer foods and food supplements. Manufacturers have greatly influenced the attitudes and practices of consumers. Nutrition educators must learn to communicate with food manufacturers, advertisers, and legislators in order to influence nutrition.

One of the most pressing problems facing educators today, declared Simmons (88), is how to effectively implement programs that are generally considered to be an improvement over the ones they are presently using. The choice of techniques for teaching and learning is vitally important for those who recognize and accept the theory that "learning is change."

The review of literature should indicate the changing food practices within the United States and the reasons for the adequacy or inadequacy of diets. Studies revealing the nutritional health and practices of teenagers were reviewed, and the causes for concern were investigated. Lastly, the problems facing nutrition educators were explored and possible solutions to these problems discussed.

FOOD PRACTICES WITHIN THE UNITED STATES

Adequacy of Diets

The United States Department of Agriculture has pioneered in studies of food consumption in the United States. Adelson (2) reported two recent nationwide surveys of household food consumption made in 1955 and in 1965. Earlier ones were made in 1936, 1942, and 1948. The 1965 Household Food Consumption Survey (34) was the first one to cover all four seasons for a continuous 12-month period. The sample included 7,500 households.

Food and Nutrient Intake Studies (34) revealed that average amounts of some foods used in 1965 were appreciably different from the amounts used in 1955. The principal differences were the increased use in 1965 of bakery products and meat, poultry, and fish, and decreased use of milk products, flour and cereals, and vegetables and fruit. Proportions of diets meeting allowances for calcium, vitamin A value, and ascorbic acid in 1965 were lower for these nutrients than in 1955. Decreased use of milk and milk products and vegetables and fruits were chiefly responsible for these changes in dietary levels.

Data from the Food and Nutrient Intake Studies (34) also revealed that a high income did not insure good diets, but a greater percentage of households had diets that met allowances at each successively higher level of income. Almost two-thirds of the households with incomes under $3,000 had diets that did not meet the allowances for one or more nutrients. More than one-third of the households with incomes of $10,000 and over had diets that were below the allowances for one or more nutrients.

Schaefer and Johnson organized and directed the nation's first National Nutrition Survey (86) funded by the United States Department of Health, Education, and Welfare. Data were collected from 10 states between 1968 and 1970. The intent of the survey was to determine the nutritional levels of disadvantaged families rather than to provide a true picture of a cross section of the total population. Sampling selection was based on 1960 census data. Although there appeared to be a consistent relationship between dietary iron intake and socio-economic status in all age groups and in all areas, the data suggested little relationship between poverty and adequacy of protein intake. Over 55 per cent of the sample families had an income of less than $3,000 a year. Family income ranged from $185 a year to $43,000 for other families in the sample. A summation of findings is as

follows: 1) 55 per cent of the total number of people studied suffered from one or more nutrient deficiencies, 2) 15 per cent of all children studied showed evidence of growth retardation, 3) one-third of the children had anemia, 4) one-third of all children studied suffered from apparent vitamin A deficiency as measured by tissue concentrations of the vitamin, 5) 4 per cent of the children up to six years of age showed evidence of vitamin D deficiency, 6) 4 to 5 per cent of the subjects exhibited symptoms of protein and calorie malnutrition, 7) 5 per cent of all people had an enlarged thyroid gland, usually due to low iodine intake.

Studies by other researchers in the field of nutrition tend to support the thesis that there are dietary inadequacies in the United States. Rechicige (78) studied a sample of 9,031 households in five states involving 33,000 individuals to determine adequacy of diets. Fifty-seven per cent of the subjects studied were Anglo, 43 per cent were Negro, and 13 per cent were Spanish-American. The mean age of the participants was 35 years; 50 per cent were 16 years of age or younger. Seventy per cent had incomes of less than $5,000 annually. Preliminary dietary information suggested that intakes for iron, vitamin A, and in some areas vitamin C, were low. The percentage of low intake varied greatly between the age groups, with low iron intake more evident in young

children. Low intake of vitamins A and C were more often reported by adolescents.

Dietary habits of 104 preschool children were studied by Metheny and associates (68). The research included an investigation of the children's families. The computation of the children's nutrient intake revealed that 21 per cent had diets meeting 100 per cent of the National Research Council recommended allowances; 61 per cent had diets meeting 67 per cent of the recommended allowance; 18 per cent had at least one nutrient below 67 per cent of recommended allowances.

Stiebling (96), commenting on dietary inadequacies revealed in research studies, said that there was an adequate supply of food within the United States. If this food could be distributed and used in accordance with the nutritonal needs of each person, everyone could have a diet that would meet the Food and Nutrition Board's dietary allowance. In Stiebling's opinion, less than optimum nutritional levels in a land of plenty and the wide gap between nutritional knowledge and food practices constituted a national crisis.

Data obtained from the National Nutrition Survey (86) provide some information relative to probable causes of certain dietary inadequacies. The greatest percentage of

families with inadequate diets was from the lowest income groups, up to $3,700 annually, and the greatest percentage meeting the National Research Council's recommendation was from families in the upper-middle income group, $5,501 to $7,250. If these figures can be accepted as representative, the number of families below the poverty level of income in the United States might provide the explanation for some inadequate diets. According to the Bureau of the Census, 1967 (103), there were 5,266,000 families in the United States with incomes below the poverty level. Of these, 3,730,000 were white, 1,536,000 were non-white; 4,865,000 families were non-farm and 402,000 were farm families. The fact that fewer farm families were below the poverty level would indicate that the adequacy of household diets had decreased with the migration of farm families to urban areas.

Studies and surveys tend to support some of the claims of dietary inadequacy in the United States but not to the extent of some exaggerated statements. Low nutritional levels, however, exist in some areas, and are sufficiently serious to merit remedial nutrition education programs.

RECENT CHANGES IN HOUSEHOLD DIETS

The American diet is continually changing. Technological advances have aided the production of many new grocery items. Changes in the pattern of living of both children and adults are reflected in dietary practices.

Source of Food Nutrients

Stitt (99) pointed out that present day diets are higher in protein than the diets in 1900. Fifty-seven per cent of the protein in 1900 came from animal sources. One exception existed in Tennessee and Georgia, where rural families obtained most of their protein from corn meal and other cereals. The diets of 1955 show a 12 per cent increase in protein obtained from daily products; a 3 per cent decrease in protein from meats, poultry, and fish; and a decrease of 13 per cent in protein from flour and cereals. Enrichment of flour and cereals is believed to be the reason for increased intakes of calcium and iron. Meats, poultry, and fish supplied more iron to the diet in 1900 than in 1955. Vitamin A intake has increased since 1900, but leafy, green, and yellow vegetables have replaced potatoes and sweet potatoes as the largest contributors. The consumption of cereals has declined, but enrichment has contributed approximately the same percentage of iron, thiamine, riboflavin, and niacin. The percentage

of calories from fat has increased, and there has been a change in the kinds of fat used. The use of butter, salt pork and lard has decreased.

Technological Advances

Technological changes have helped revolutionize the food industry. Refrigeration has made possible a wide variety of frozen and pre-prepared meals. New methods of processing and packaging foods have contributed to changed dietary practices. Bensinger (9), Food Editor of The Dallas Morning News stated:

> . . . something you eat for dinner tonight probably will be quick-frozen, freeze dried, enriched, artificially sweetened, chemically flavored or synthetically reconstructed in a chemist's laboratory.

Bensinger commented that the ever-growing variety of processed foods makes cooking easier but that it also makes the preparation of nutritionally balanced meals, or even finding out what is in them, more difficult.

Bensinger (9) reported that the wide variety of prepackaged meals has been cause for concern by the Food and Drug Administration. For example, the basic ingredients of the popular Mexican-type meals are corn and a low grade meat, nutritionally high in calories and low in protein. The

recommendation has been made that prepackaged meals be labeled to indicate the nutrient values of ingredients and that prepackaged meals be required to have a balance of food nutrients.

An article by English and English (27) disclosed that popular health fads have contributed to changes in household diets. Protein supplements are highly advertised as an aid in weight reduction. Nutritional boosters in powder form are obtained from beef, vegetables, sea sources and granules of soy bean meal. So-called health foods include nuts, seeds, dried fruits, natural honey, herb teas, cereals, fruit juices, oils and dressings. In addition to natural cereals and grains, flax seeds, millet, bulgur, alfalfa, barley, sunflower and pumpkin seeds are sold.

Competition in the market place for consumer foods has resulted in many new methods of processing and packaging. The practice of milling wheat and rice to obtain a more attractive product has operated to eliminate basic protein content and other nutrients. Robinson (81) noted the use of additives for enrichment in bread, milk, cereals, and many other food products.

These changes in household diets have been nationwide. The customer appeal of a new product has been very economically

helpful to the food manufacturer. Advertising agencies are constantly striving to determine ways to gain the interest of the consumer. Production of food has changed and will, no doubt, continue to change. Changes in patterns of living have necessitated many changes in food preparation and service. The homemaker faces increasing difficulties in selecting nutritious food for her family.

Changes in Patterns of Living

Another recent change in household diets is related to the number of meals eaten daily. According to Hill (47), one or two additional small meals or snacks have become a part of our culture. Nutritionally, these dietary practices are satisfactory if the total daily intake meets the individual's needs for food nutrients and the intake does not exceed the need for calories.

Several studies indicate the extent of the extra meals practice. A Gallup survey (37), conducted in 1968, revealed that 28 per cent of the people interviewed consumed snacks in the mid-morning and mid-afternoon. Bricker (12), in a study of 113 clerical workers, found that 70 per cent had coffee and cake in the mid-morning break. Dickins (21) reported a nationwide survey and noted an increase of 15 per cent in the number of eight-ounce cups of beverages consumed

in 1965 over the number consumed in 1955. Soft drinks, coffee, and other beverages have replaced milk to a large extent.

Another factor closely associated with changes in household diets is the increasing number of homemakers who combine a career with homemaking. The Bureau of Labor Statistics (103), 1968, reported that the average number of women employees in the United States, 16 years of age and older, was 27,806,000. This was in contrast to 48,113,000 male employees. Not all of the women were homemakers, but the significance of these figures is verified by other studies.

Data from the 1965 National Survey of household diets were summarized by Adelson (2) and revealed that consumption of meat, poultry, fish and bakery products per person was greater in households with homemakers employed outside the home. These figures were found to be true in high and low income levels, in urban and rural areas, and in the North and South.

Dickens (21) conducted a study of food purchases and use practices of 540 Mississippi rural and urban families, Negro and white, with wives gainfully employed. The conclusions reached were that gainful employment of the homemaker changed household diets because:

1) The most rapidly growing group of gainfully employed-wife families is the white urban group. This group (a) uses more meat, fish, poultry, fruits and vegetables than other groups with non-working homemakers, and (b) is less wedded to traditional menus and foods.

2) Families of rural gainfully employed women are shifting from home production of food to purchase of foods.

3) There is more eating at restaurants, lunchrooms and cafes in gainfully-employed-wife families.

4) Men and boys in gainfully-employed-wife families are playing an increasing role in family food activities.

These changes in household diets do not necessarily indicate that nutritional levels have significantly increased or decreased. There is no cause for alarm by the homemaker or the educator. The situation does demand recognition by everyone that life styles have changed and will probably continue to do so. There is a need for increased information concerning the choice of food. Leverton (56) maintained that the homemaker must understand that body needs can be met by a variety of ordinary foods; must learn to prepare, reconstitute, or thaw foods to feed herself and her family; and enjoy food for its social and cultural contributions.

REASONS FOR DIETARY DEFICIENCIES

Few aspects of living are as likely to be emotionally charged as those associated with food. Babcock (6) emphasized that many factors influence food choices. Many factors are interrelated. To understand fully the factors that determine food acceptance would require a multidisciplinary approach. Cultural, ethnic, and socio-economic factors are some commonly accepted reasons for dietary deficiencies; all overlap to some extent.

Culture

Hill(47) defined culture as the total man-made part of man's environment. Studies conducted by nutritionists and social scientists in different parts of the world provide evidence that food intake of an individual is influenced by the rules and traditions of the society in which he lives.

No national or regional surveys could be located but a number of individual research studies are available. Dickins and Ferguson (23) made a study of 844 white and Negro adults and 680 school children in two rural counties in Mississippi. The findings indicated that culture motivation was evident in selecting menus. The subjects tended to prefer one menu over the other because it contained one food extremely well liked.

An entire meal was chosen because it included this item. Dietary deficiency could occur if the chosen item lacked nutrient value.

Another study of the effect of culture on menu selection was made by Dickins and Fanelli (22) on white and Negro homemakers relative to likes and dislikes between sweet milk and another drink. When coffee was the other drink, a much higher proportion of Negro women than white women chose sweet milk as the preferred drink. When the other drink was buttermilk, a higher proportion of white than Negro women preferred sweet milk.

Further study was conducted of this group of white and Negro homemakers to determine whether these apparent cultural differences were due to difference in income and education between the two groups. The homemakers within each racial group were subclassified by family income and by education of the respondents. No significant differences were found <u>within</u> each race. The researchers concluded that cultural differences appeared to account for expressed preferences. A further conclusion was that food preferences, which are to a large extent determined early in life by cultural patterns of the family, remain fairly stable in the absence of change in group preferences. If these cultural

patterns favor inadequate diets, nutritional deficiency is the likely result.

The locality in which people live is a part of their culture. Pilgrim (76) reported a research study relative to foods people accept or reject. Food preferences of army personnel at a large military base were studied. One of the major findings was differences manifested in food preferences by young men from the North and the South. Army personnel from New England areas rejected sweet potatoes and rice. Young men from southern states rejected clam chowder, cod-fish cakes, and other New England dishes. General popularity was manifested for the staples of the American diet, bread and white potatoes. Cultural differences, it appeared, operated in the acceptance or rejection of the army diet.

Ethnic Factors in Dietary Deficiency

Food has many symbolic meanings to each individual. Livingston (58) asserted that the food habits of a group are products of the group's present environment and past history. Robinson (81) pointed out that food habits may have existed among a given ethnic group for centuries, and such a heritage may account for great conservatism in accepting change. Most of the people in America today have been here for

several generations and have come to enjoy the endless variety of foods available. Many people, however, continue to relish favorite dishes associated with holidays and religious customs. People do derive a sense of well-being when a favorite traditional dish is served to them.

Lowenberg (59) disclosed that orthodox Jews observe dietary laws based on Biblical and rabbinical regulations. Milk and meat are eaten, but never in the same meal. When three meals are eaten daily, the usual pattern is for two meals to contain dairy products and one meal to include meat or meat products. Meat from the cow, sheep, ox, and the goat is considered clean, but meat from the camel and pig is forbidden. Only fish with both fins and scales may be eaten.

Spanish-speaking people have long been noted for a low standard of living. In an effort to improve living conditions of 8,000,000 rural people living in western Mexico, the Lerma Plan, discussed in the 1969 World Almanac (103), was launched with funds from the Inter-American Development loan. Poverty, the lack of productive land and the lack of education have operated to influence the dietary pattern of this segment of the population. The diet of the Mexican people is believed to have been a predominant factor in their lack of progress. Chili, tamales, fried beans and fried rice are the

staple foods. Corn and maize and a low grade of meat are the main ingredients in the majority of Mexican dishes. Hill (47) maintained that the familiar foods should be available to children where rice and beans are used as regularly as other families use bread, but suggests encouragement of these children to add tomato juice or some other source of vitamin C and a glass of milk to their usual breakfast of rice and beans. Hill also emphasized that all children should learn that an adequate diet can be made up of many different food combinations and that social studies classes provide a natural setting to learn something about the eating patterns of other nations and cultures.

According to Torres (104), the basic foods consumed by Puerto Ricans are rice, legumes, and starch vegetables. The diet is high in carbohydrate and fat. Neither fruits nor vegetables are eaten in adequate amounts. The limited income of these people is responsible for the lack of meat.

The staple foods for the Italian diet are readily available. Practices reported by Robinson (82) revealed that pastas are an important staple of the Italian diet and are believed to be responsible for the prevalence of obesity. Milk is not as widely used as it should be, although cheese is used extensively.

Socio-economic Factors in Dietary Deficiency

Socio-economic causes of dietary deficiency, as reported by Hendel (46), include family income, urbanization, and education of the mother. Ample evidence that these factors are significant causes of dietary deficiencies can be found in nutritional literature.

According to the 1965 National Survey of Household Diets (5), the adequacy of diets was closely related to family income. At each successively higher income level, a greater percentage of households met the recommendations of the National Research Council. Low and high income families differed in the use of many foods. The high income group used beef, poultry, whole milk, eggs, commercial ice cream, frozen and fresh vegetables. The lower income groups used less beef and more dried milk.

Hendel and associates (46) researched socio-economic factors influencing food habits and nutrient intake of 302 Ohio school children, 9 to 11 years of age. The average vitamin A and C contents were compared with the National Research Council recommended allowance, 1963 revision. Vitamin A and C intakes were evaluated on three levels of adequacy: 100 per cent or above, 67 per cent to 100 per cent, and below 67 per cent of the recommended allowance.

The findings revealed that the intake of vitamins A and C was positively related to the socio-economic factors of income, degree of urbanization, and mother's education. A consistently higher proportion of urban than farm children from low and high income families had diets adequate in vitamins A and C. The education of the mother was more consistently related to level of adequacy of vitamin A and C in children's diets in farm families than in urban. Children from urban families with incomes below $3,000 and whose vitamin A intake was considered borderline were found to have consumed 49 per cent less milk and 38 per cent less butter or margarine than those whose diets were considered adequate in the same group. In the overall findings, the adequacy of vitamin A and C intakes in the children's diets showed a direct correlation with family income level.

Numerous studies might be included in this research indicating a close relationship between income and adequacy of household diets. The validity of the national surveys, it is believed, is sufficient to warrant the assumption that low incomes of families directly affect household dietary inadequacies.

NUTRITIONAL STATUS OF TEENAGERS IN THE UNITED STATES

Causes for Concern

The eating habits of teenagers, approximately 28 million in the United States, have been of concern to many teachers, parents, school lunch operators, dietitians, and physicians. Everson (32) asserted that researchers in the field of nutrition agree that this age group as a whole practices limited judgment in food intake. Girls, in particular, have poor dietary records.

Some of the shortcomings in the diets of adolescents are as follows: too little calcium due to a low consumption of milk; insufficient intake of green and yellow vegetables and fruits, resulting in sub-optimal supplies of vitamin A; too little ascorbic acid; and questionable provision for an amino acid mixture which will support optimum growth and health. A number of studies have been conducted to ascertain the extent of poor dietary practices among teenagers, some special problems and some possible causes for deficient diets.

Huenemann (49) conducted a review of teenage nutrition for the United States Department of Agriculture in 1966. On

the basis of evidence from a number of surveys, the conclusion was reached that the nutritional status of teenagers as a whole was not known. However, studies of numerous groups indicated tremendous variations in measures of nutritional status and tended to support the view that a proportion of the teenage population did have nutritional problems, mainly in the areas of weight, early pregnancy, anemia, dental caries and other problems.

Hinton and associates (48) cited surveys indicating that the diets of adolescent girls were frequently low in calcium, vitamin A, ascorbic acid and sometimes the B-complex vitamins. A regional survey of adolescent nutrition in the Western Region of the United States was reported by Spindler (94) wherein the findings revealed a high percentage of teenagers with poor dietary habits. Data were taken from 800 boys and girls between the ages of 13 and 15 years. This group was getting less than two-thirds of the nutrients recommended by the National Research Council.

Weight problems.--Weight problems were found to be of concern to the teenager and the nutritionist. According to Eppwright (30), obesity was a major health problem to adolescents and adults. Bruch (14) expressed concern about the present cultural attitude in the United States of which any degree of plumpness is condemmed as "deplorable fatness."

Teenage girls are prone to starve themselves to attain slimness. Health and personality problems are created as a result.

Heald (45) characterized adolescent obesity as a significant clinical problem resistant to treatment and likely to progress to severe obesity in adulthood. Although food intake has an unequivocal relationship to obesity, attention to food intake alone has not been successful in either prevention or treatment. Factors such as heredity, body metabolism, or extent of physical activity enter into the problem.

Spindler (94) reported a study in Maine which showed that 30 per cent of the 15-year-old girls and 10 per cent of the boys were overweight. In Iowa, 44 per cent of the girls were overweight as compared with about 19 per cent of the boys 16 years of age.

Goldsmith (40) reviewed several studies concerning nutritional problems in the United States. The conclusion was reached that nutritional diseases due solely to an inadequate diet have almost disappeared. A study of three population groups found caloric overnutrition to be very prevalent. In all sections of the country, adolescent girls tended to be overweight and to have poor diets. Primary

vitamin deficiency was considered quite uncommon, but there was room for improvement in certain segments of the population. In Louisiana, scurvy was diagnosed in one person out of 1,943 hospital admissions. The highest incidence of enlargement of the thyroid gland was in a parish on the Mississippi River below New Orleans. The most common nutritional deficiency reported was iron deficiency. Nutritional problems that are secondary to other diseases are numerous. Serious protein and calorie malnutrition was observed occasionally in neglected infants referred to large city hospitals. Thiamine deficiency was encountered primarily among alcoholics; osteoporosis occurred frequently in the elderly.

Early pregnancy.--The health aspects of pregnancy in adolescents are receiving increasing attention. Infant mortality and morbidity statistics for the United States are closely linked with adolescent pregnancy. In 1966, the Food and Nutrition Board of the National Research Council organized the Committee on Maternal Nutrition (67). The Children's Bureau of the United States Department of Health, Education, and Welfare provided financial support for the Committee's work. The report of the Committee on Maternal Nutrition presented findings regarding the nature and magnitude of the biological and social problems accompnaying pregnancy and childbirth in adolescent girls. Results indicated

the following:

1) Girls who become pregnant before they are 17 years of age are subject to greater biological and psychological risk.

2) The number of infants born to girls under 17 years of age has increased since 1960. In 1960 the total number of infants born to girls 17 years of age and younger was reported to be 189,188. By 1965 the number had risen to 196,372.

3) In 1965, 18.7 per cent of the low-birth-weight babies born alive in the United States were born to mothers under 15 years of age. As maternal age increased, the proportion of low-birth-weight infants decreased, up to age 40.

4) Death rates were much higher for infants born to mothers under 15 years of age.

5) Pregnancy may bring psychological problems.

Van de Mark and associates (105) stated that the young family in which the mother is a teenager is a nutritionally vulnerable group. Reports indicate that a large number of the teenage marriages are among girls of the lower working class who frequently have poor levels of nutrition. In an effort to provide information about dietary levels and nutritional deficiences of teenage families, a study was made of 100 families in the Birmingham, Alabama, area with the cooperation of the Jefferson County Health Department. Only families in which the mother was a teenager and the father resided in the home were included in the study. The 24 hour

recall method was used to evaluate the diets of the 100 families. Although the families were divided into racial groups and income groups, the findings indicated no significant differences among them. The overall finding was that the young mother did not provide her family with adequate amounts of milk, vegetables, and fruits and total calories for the day to provide nutrients as recommended by the National Research Council. The results of the study indicate a need for programs to help alleviate the nutritional inadequacies in these young families.

According to Spindler (93), parenthood for the teenage mother creates added physiological stress. Young girls often show the effect of poor nutrition during pregnancy. Babies may be born prematurely, have congenital defects, or have inadequate nutritional stores. Underweight and anemia place the pregnant girl in a high risk category. Markham (65) pointed out risks of prenatal undernutrition in teenagers who had been cutting calories and stressed that iron deficiency occurred in many young women. The incidence of anemia was not related to educational or social status.

Dental caries.--Huenemann (49), reviewing teenage nutrition, found dental caries to be one of the problems of adolescents. A number of studies indicate that calcium was

one of the neglected nutrients in teenage food intake. Alford (4), reporting on bone growth and development, emphasized the complexity of bone tissue and the multiple nutrients involved in bone growth and maintenance. Robinson (82) listed dental decay as one of the most prevalent diseases in the country. Schaefer and Johnson (85) conducted a Texas-Louisiana survey of over 6,000 adults and children and found that 20 per cent wore dentures of some kind; 90 per cent needed fillings or extractions; 45 per cent had some degree of periodontal disease; and 18 per cent had pain when biting or chewing.

Data from the Nutrition Survey in Texas, directed by McGanity (62), revealed that the overall condition of teeth and gums was poor. Of all persons age 10 and over, 17.8 per cent had trouble with either biting or chewing. Severely destructive periodontal disease with pocket formation was present in one of five of all subjects examined. Over 90 per cent of people examined had one or more carious teeth in need of filling or extraction. The pattern of dental decay began in the 5 to 9 year group and reached adult levels after age 10.

Many other factors influence the presence or absence of dental caries. Hill (47) contended that adequate water

fluoridation, limited use of sticky, highly sweet foods, and thorough cleaning of the teeth after ingestion of food could result in a 50 per cent reduction of dental caries.

Academic performance.--One other problem mentioned in teenage nutrition literature relative to food intake was the possible effect of nutritional deficiency on academic performance. Allen and associates (5) expressed the belief that nutrition, dietary habits, and food attitudes have complex effects on skill levels, work aptitude, and social maturation of the adolescent. Allen cited recent studies of preschool malnutrition in developing countries indicating that the lack of nutrients during the critical period of growth and development of the central nervous system may cause irreversible damage to subsequent mental development. As a corollary of such opinions, a three-part questionnaire linking intrafamily relations, food and nutrition, and vocational orientation to maturation and vocational preparation of high school students was administered to all students attending a high school in a rural county of a southwestern state. Statistical analysis of the data obtained from the questionnaires demonstrated consistency of findings that food and nutritional factors exert significant influence on school performance, social maturation, and vocational preparation of high school youth.

Possible Causes of Deficient Diets

Some persons, particularly adolescents, tend to adopt questionable dietary habits which are recognized as contributing to serious health problems. Most of these practices are expensive, useless and, in some cases, harmful. The extent of these practices and the possible causes are not completely known, but dietary fads, taste sensitivity, food prejudices, poor choice of snack foods, psychosomatic aspects, and physiological patterns are involved.

Dietary fads.--Most teenagers want to meet the approval of peers, therefore, snacking, "fad" foods and meal skipping becomes a part of daily life. Hinton and others (48) concluded that fear of gaining weight is an obsession with many adolescent girls. Erhard (31) investigated young people in the San Francisco Bay Area centered around Berkley, California. Food faddism, coupled with vegetarianism has become the panacea for some members of the "hippie" group.

Wang (106) conducted a study of food fads among three groups of respondents. The participants in the research included 1) homemakers in organized clubs, 2) low income homemakers, and 3) 4-H members in the 13 to 15 year age category. All of the respondents were clients of the University of Maryland Extension home economics department. The homemakers

in the organized clubs were largely middle-income women; low income homemakers were drawn from housing projects, community programs, or neighborhood centers; and the 4-H group was comprised of members of that organization.

The questionnaire administered to the different groups contained 40 statements illustrating many prevalent ideas about food values and food practices. The answers were true or false and the information was relative to fads, fallacies and folklore concerning food. Findings indicated that women in the Homemaker Clubs were better able to differentiate accurately between food facts and fallacies than were low income women or 4-H youth. In regard to nutrition information, the level of knowledge of the 4-H groups in general was similar to that of the low-income homemakers. Homemakers in organized clubs scored higher than the low income women or 4-H youth.

Spindler (94), in reporting the Nutritional Status Studies of 800 boys and girls in the Western Region, reached some conclusions relative to deficient diets of teenagers. A tendency to select "what everyone else eats" was noted. The "in thing" was not to eat breakfast. Teenagers refused to drink milk because they thought it was childish or because they thought milk contributed to fatness. Research

by Eppright and Swanson (29) indicated that young people consumed one to three snacks each day. One-fourth of teenagers' calories reportedly came from snacks. Snack foods were classified as "empty calories," foods made up chiefly of fat, sugar and starches with small amounts of vitamins, minerals and protein in proportion to the calories.

Jalso and associates (51) conducted a study to determine if an association exists between beliefs and practices of food faddists and one or more of the following characteristics: age, socio-economic level, educational level and personality rigidity. In addition, data were obtained on sources of nutritional information and the underlying bases for and extent of selected nutritional practices. Two questionnaires were designed to obtain demographic data and to test nutritional opinions and nutritional practices. Findings indicated that a sub-sample "faddist" group had less formal education and less nutritional knowledge than a non-faddist group. The direct relationship between education and valid nutritional opinion and practices reflected the influence of age rather than education. Misinformation prevailed in all areas of food and nutrition.

Taste sensitivity.--Taste sensitivity is another area that may be responsible for the deficient diets of teenagers.

Investigation of the bases for food preference is essential for understanding food behavior. According to Jefferson and Erdman (52),sensitivity deals with one of the most dynamic problems in nutrition, yet nutritionists have contributed relatively little to knowledge of food intake. Several workers have tried to relate sensitivity to one or more of the four basic tastes to the number of disliked foods.

Jefferson and Erdman (52) made a study of the possible relationship between the food preferences of 13 and 14 year old teenagers and recognition thresholds for the basic tastes, sweet, sour, salty and bitter. The 45 teenagers who participated were surveyed for their food preferences and then tested for taste sensitivity to strong concentrations of various compounds. The findings indicated a significant relation between disliked foods and the bitter compound with which they were tested. No such relationships existed for any of the other test solutions. For this group of teenagers taste sensitivity appeared to be a minor factor in food acceptance.

The relationship of taste sensitivity to food selection was inadvertently tested in a study relative to correlation between food aversion and personality. Smith and associates (92) administered a check list of 28 selected foods to 235

undergraduate students in introductory psychology classes. The respondents were requested to circle the foods they disliked and to write the reason for so doing. An examination of responses indicated that slightly less than one-half of all answers consisted of "I don't like the taste." Forty per cent of the reasons given by those with the highest number of food aversions could be categorized as responses which would not normally characterize food.

Food prejudices.--Pilgrim (76) surveyed attitudes which are important in the acceptance of food. Throughout life every individual has had different food experiences which have helped to form his present eating habits. Too often some prejudice against a certain type of food, regardless of its nutritional value, prevents its selection as a part of the daily menu.

An individual in any type of teaching situation involving selection of foods needs to understand the effects of early influences in order to plan training procedures more intelligently. Some studies in the field emphasize the part than an individual's early background plays in the development of his food habits.

Brown (13) conducted a study to determine the food preferences and how they were acquired. The sample was

composed of 39 junior-senior students in an upper level nutrition course, and 62 freshman students in an introductory nutrition course at the University of Illinois. The students were requested to write papers describing the development of their present food habits, covering their preschool, grade school, high school and college experiences; how they thought the habits had been formed; and specific likes and dislikes. Experiences associated with food, both pleasant and unpleasant, were included.

The results of the study indicated that one of the determining factors of an individual's food habits is his early background: parents, place of residence, income, and family size. The students indicated that their mothers were the most important influence during their early period of development.

The study also showed that dislikes of a certain food could often be traced to being forced to eat it. Twenty-nine per cent of the freshmen and 7.7 per cent of the upperclassmen recalled being forced to eat. On the other hand, 14.5 per cent of the freshmen and 25.6 per cent of the upper classmen thought that their ability to eat and enjoy a large variety of foods was due to being taught as children to eat at least one spoonful before passing judgment on a food.

At the 1971 National Meeting of the Future Homemakers of America, Cupp (19) distributed questionnaires to the attending teenagers requesting information relative to their eating habits. Of the 60 responses, an overwhelming majority indicated that, in spite of their nutritional training, their mother was the one who had the greatest effect on their eating habits. If the mother held prejudices against certain foods, these prejudices tended to be passed on to the children.

A questionnaire on food practices and preferences was administered to 394 freshmen at New Mexico State University by Stasch and others (95). In general these students had a basic knowledge of good nutrition, as evidenced by their selection of foods, but the mother of a family was found to have more influence in breakfast-eating habits than nutrition training in high school or in a 4-H club. The inference here is that training in nutrition for future homemakers is highly important in terms of future generations.

Poor choice of snack foods.--Studies by Manno (64) revealed that eating between meals is a well established custom in this country. Government surveys show that most people regard snacks as extra and not as foods that will supply part of the day's nutrient needs. Over two billion dollars is spent annually on such items as pretzels, nuts, corn chips,

potato chips, crackers, and spreads. Ten to 15 per cent of a person's daily calories is supplied by some type of snacks. Huenemann (50) recommended the exploration of the causes of deficient diets by teenagers in order to better plan for nutritional education at the teenage level.

According to Manno (64), snacking is not harmful in itself if done sensibly. All foods supply both calories and nutrients. With a little care, snacks can be selected to provide adequate amounts of the essential foods in the Basic Four Food Groups. Research in the field, however, indicates that teenagers do not always snack intelligently. Studies by Eppright and Swanson (29) concluded that teenagers in Iowa made a poor selection of snacks. One-fourth of the calories reported came from foods made up primarily of fat, sugar, and starches. The teenage girl requires about 2400 calories daily; if she selects a high proportion of "empty" calories, it is difficult to provide needed nutrients.

Litman (57) reported a survey made by the Minnesota State Department of Health. One facet of the survey involved students in the public school systems keeping three-day records of their eating habits and snacking patterns. In addition, each was given the Lewin Food Anchorage test, as well as a nutrition information questionnaire. A random

sample of 1,039 students, between fourth grade and junior college, was selected for intensive analysis.

Data other than food selection and snacking practices were obtained by Litman (57). Primarily urban residents, 79.92 per cent lived in town, 20.08 per cent in the country. Ages ranged from 10 to 22 years. An evaluation of their fathers' occupations, by the use of the Goodenough and Anderson Minnesota Occupational Index of Socio-Economic Class, revealed that approximately 57 per cent were from the so-called blue collar homes, 24 per cent from white collar homes, and only about 15 per cent could be classified as having parents with professional backgrounds. These data are important in studying food selection and snacking patterns of the study respondents.

In the matter of food selection, an analysis by Litman (57) of the nutritional adequacy of the diets indicated that 44.6 per cent could be considered good, 31.77 per cent fair, and 23.62 per cent were poor. Of the Basic Seven food categories, the only markedly inadequate items were green and yellow vegetables.

In the area of snacking, Litman (57) obtained data from only 724 of the 1,039 respondents. Of these, 17.18 per cent could be classified as frequent snackers, 12.43 per

cent as habitual snackers, and less than 3.00 per cent reportedly never snacked. Among the snack foods, there was considerable preference for fruits and vegetables, candy, cookies, white milk, and carbonated beverages. Some interesting variations were manifested. Students from the higher income levels appeared to snack more frequently on fruits and vegetables, whereas candy headed the list of snack foods for those in the lower income groups. The conclusion reached from the study was that the apparently low status of such generally accepted foods as the green and yellow vegetables and liver would seem to pose a real problem to those charged with the responsibility of altering or improving the food habits of children.

Psychosomatic aspects.--Brown (13) studied the eating habits of college students and concluded that for most people, the eating of food serves more than just satisfaction of physiological nutritional need. Eating can arouse many emotions. According to Roundtree (84), "food is eaten for enjoyment, for emotional release, for social prestige, and for attention." Moore (70) stated: "Everyone has his taste and from infancy until death he concerns himself with seeking and enjoying the kinds of food that are most pleasurable to him." When nutritionists attempt to design a nutrition program, non-biological needs should not be ignored. Brown (13)

also found other problems that influence food selection. The economic status of the family may preclude any but a narrow selection of necessities. The snack items casually accepted by the child from an affluent family constitute a rare treat for the child from the poor family. The child may resent all phases of nutrition if the items enjoyed are removed from his diet because they have little nutritional value.

Blackburn (10) raised a question about the true nutritional value of soda pop and potato chips, two "treats" favored by teenagers. Children usually have high energy expenditure levels, "so what makes calories from potato chips and soda undesirable?" To substantiate the comparison, an analysis was made from a nutrient standpoint of the nutritionally accepted apple to a one-ounce bag of potato chips. As analyzed by Blackburn, the one-ounce bag of potato chips is superior to the apple in all nutrients except vitamin A. The inference for the nutrition teacher is to not only know the nutrient value of "taboo" foods but to have some understanding of what they mean to children. Foods classified as "treats" are oftentimes cherished by the economically deprived child. Herein lies the problem for the teacher; search for effective ways to let the child "have his cake

and eat it too"--help him to eat properly and still have a few favorite foods.

Hinton and associates (48) in studying the psychological, sociological, and physiological factors influencing the eating behavior and dietary intake of girls 12 to 14 years of age concluded that poor psychological adjustment adversely affects all behavior, including that related to eating. The recommendation was made for a program in nutrition education that would consider the home environment of the adolescent girls. On the other hand, effective means of reaching the parents need to be devised if parents are to understand the problems of adolescents and to provide a healthy home environment.

Spindler (93) named a number of concerns that are important to teenagers and in turn are related to food and nutrition. 1) The teenager wants his peer group to like him. 2) The teenager wants to be with others of his group. 3) The teenager is sensitive to his appearance, hair, skin, posture, and weight. 4) Teenagers admire others with vigor, pep, and energy. 5) Teenagers want to be popular. As a result, there is great pressure on adolescents to conform. The child from a poor family who does not possess adequate means to select the same nutritious foods as the child from

a more affluent family may have an unfavorable psychological reaction.

Physiological problems.--Many physiological problems enter in selection of food by adolescents. Some teenagers are obsessed with the fear of overweight whereas underweight may be a serious concern for others.

According to Eppwright (30), recent studies have shown that teenagers frequently do not get sufficient calories. The body's way of adjusting to this lack results in slower growth and perhaps less resistance to infection. A calorie shortage operates to cause ineffective utilization of protein and calcium in the body. When the diet does not supply sufficient carbohydrate and fat calories for the body's needs, protein is used for energy instead of tissue building and repair.

Optimal nutrition for every person is a challenge for all professionals involved with health education. In a discussion of nutrition education of today, Harper and Kupsinel (43) asserted that nutrition educators of the 1970's have the responsibility to teach every student to become an informed citizen who can ". . . judge when claims are false or exaggerated . . . choose foods to fit his size, developmental stage and activity . . . and understand that body needs can be met by a variety of ordinary foods. . . ."

NUTRITION EDUCATION FOR THE "NOW" GENERATION

Is nutrition education relevant? The answer lies in a new definition of home economics designed to reflect the changes in today's society. Byrd (16) stated: "Home economics is the study of the human and material forces affecting homes and families and the utilization of this knowledge for the benefit of mankind." Under this concept, homemaking has a vital role to play in the development and educational processes of families in a society which is characterized by rapidity of growth, high levels of productivity and consumption, an explosion of knowledge, and the growing interdependence of mankind. Nutrition education designed to meet this concept is not only relevant but vital in the progress and welfare of the people.

To be effective, nutrition education must motivate people to change behavior patterns in food selection and adopt habits that will cause them to achieve adequate nutrition. Innovative educational programs that will be accepted and followed are a major need. The homemaking teacher, therefore, is one of the key personnel in planning, motivating, and developing a nutrition program designed to meet the needs of a dynamic flexible society.

MacReynolds (60) recognized that the teaching of "good" nutrition may be ineffective. Food is basic to life. Selection of foods and eating patterns help determine nutritional status which, in turn, influences growth and development and well-being. In addition to meeting physiological needs, food selection and eating patterns are important in economic and social development which affect nutritional behavior.

A variety of problems arise when teachers of nutrition are confronted with the necessity of planning and implementing a curriculum to meet the needs of modern society. Sipple (90) found that one problem involved the presentation of information that would be accepted and practiced. Another challenge involved the use of existing educational systems to carry nutritional information to the various segments of the population in a truly effective way.

Nutrition is a part of several health-related subjects in the public schools. Steinburg (97) is convinced that nutrition is being taught poorly. MacReynolds (60) suggested the integration of nutrition as a part of the life experiences of the students. A national School Health Education Study (86) documented the need for improvement in nutrition content and methodology. The survey involved 1,101 elementary schools and 359 secondary schools throughout the United

States with a total enrollment of 850,000 pupils. In addition to evaluating health education as it was being taught in the United States schools, the survey also identified health behavior and health misconceptions of the students. The overall conclusion reached was that in many cases pupils were being taught the same nutritional subject matter year after year without an orderly and continuous advancement and that a wide gap existed between knowledge and practice.

The statement of a behavioral objective is intended to communicate the outcome of some unit of instruction. Gagne (36) defined a behavioral objective as a statement of what the students should be able to do as a result of the instructions.

Classroom teachers exert a strong influence on the attitudes and health of children. Chatfield (17) expressed the opinion that the classroom teachers are best suited for this phase of the curriculum. Few, however, are equipped with a knowledge of subject matter and methods to meet the task. The National Research Council of California conducted a survey of classroom teachers to determine where the classroom teacher secured needed information on nutrition. The conclusion from the data obtained indicated that teachers relied on television, newspapers and non-professional magazines.

The second grade teachers in the study were generally aware of the Basic Four Food Groups but less than one-half were able to plan a balanced meal. Obviously, teachers cannot effectively teach nutrition when they are not well prepared. Sinacore (89) declared that the challenge is not only to teach nutrition but to prepare teachers for effective instruction in this area.

INSTRUCTIONAL TECHNIQUES AND DEVICES

The use of behavioral objectives in teaching nutrition calls for changes in techniques and devices of instruction. Since the objective of instruction has shifted from mastery of subject matter to change of behavior, the techniques and devices will be learner centered.

Spitze (94) emphasized the following principles as basic to an effective nutrition program utilizing behavior objectives as its goal:

1) If a student is involved in choosing the techniques, he will be more accepting of the resulting situation.

2) If the learning situation is a part of real life or seems real to the student, he will perceive the relevance and be more eager to learn.

3) If a student is participating, mentally as well as physically, his interest will be greater and achievement more rapid.

4) If there is ego involvement or psychological ownership in the learning situation (that is, the student has a personal interest in the success of the technique), motivation and learning are increased.

5) If the chosen technique helps a student to experience success, his self-esteem and motivation will be enhanced.

6) If a student finds pleasure in the learning situation, he is more likely to continue learning.

7) If a student develops skills for independent learning, he can continue to learn after his formal schooling is finished.

8) If a student sees usefulness in his learning activities, motivation will be increased.

9) If a student develops positive attitudes toward learning, he will be more likely to continue learning independently.

In the light of these principles, Spitze (94) concluded that a teacher who wishes her teaching to achieve the goal of behavioral objectives will choose those objectives which provide:

1) the most active participation of students,

2) the greatest degree of reality or concreteness, and

3) the most personal interest or ego involvement of students.

Teacher creativity.--The approach to the nutrition education program based on behavioral objectives can provide

many opportunities for the teacher to be creative in teaching techniques. According to Tacionis and Rice (99), the most compelling motive for learning is the student's need for the information. The creative teacher who understands the environment of her subjects and is cognizant of their social as well as physical and educational needs can find an unlimited supply of teaching situations directly involved in living problems.

Niemeyer (73), chief dietitian at the hospital based Restoration Center, Veterans Administration Hospital, East Orange, New Jersey, is concerned with the rehabilitation of the individual to meet his nutritional needs in varying situations. The nutrition education program goals are accomplished by continuous behavioral observations and a feedback of information.

Vargas (106) suggested that emphasis should be placed on student activity instead of teacher activity. Teachers could present a lecture in an empty room and classify the effort as "teaching," but learning involves more than presentation of facts. When planning a session or course, the teacher should have some idea of what is to be accomplished with the students. During the teaching sessions, the instructor will make sure that each learner can engage in appropriate behaviors. Vargas used a low-sodium diet to

illustrate the difference between a traditional method of instruction and the behavior-objective type of instruction. The traditional method of teaching might be limited to an explanation of how to select foods from a daily menu to meet various sodium restriction, starting with simple menus and progressing to more complicated ones. A better method would be to have the patient select foods from a daily menu to meet various sodium restrictions. Desirable behavior is an outcome of patient response.

According to Morrison (71), the need for educational objectives stated in behavioral terms stems from the definition of learning itself. If learning changes an individual's capabilities, the student can do something today that he could not do yesterday. Gassie and Jones (38) found that teaching became the technique to change behavior and provide motivation for the learner to change. Sustaining these changed behaviors was a challenge for both the teacher and the students. An eight week nutrition education program was evaluated. Evidence of changed eating habits was observed for a period of four months after the end of the program. Findings indicated a need for more extensive education programs which would provide repeated learning experiences.

Management and motivation within the classroom.--Effective learning experiences have some essential characteristics. Ack (1) listed some of these:

1) For learning to occur, learning must be relevant. Relevance as used pertains to the meaningfulness of the subject matter to the current life situations of the students. Sargent (84) stated that learning is an active encounter and involves interation with one's environment and past experiences. If the educative goal is motivated students, then the instructor's task will include demonstration of the importance of the material to current life needs and goals of the students. Ack (1) asked the question:

> How can course material be relevant if the student is never consulted about what he feels he needs to learn, about the sequence of the presentation of material, or about the time required for its explanation?

Spitze (95) concluded that students enjoy and benefit from a variety of teaching techniques in direct proportion to their involvement in choosing subject matter and techniques and to the realistic aspects of the learning situation. Finley (33) stated that it is a known fact that students learn and retain to a greater degree the subject matter in which they become directly involved.

2) For learning to occur, the learner must be active. Ack (1) fears that teachers prefer passive students and that automation, rather than active mobile searching is encouraged. Spitze (94) reinforces this statement by saying that the student who participates mentally and physically will have greater interest and make faster achievement. Vargas (106) stated that learning experiences should be designed in order that the learner says and does the things formerly presented in lectures and demonstrations. Behavior can be more effectively achieved if each learner actively participates and is rewarded for successful completion of each step.

3) For learning to occur, the activity must be pleasurable. Too few instructors seriously attempt to make their courses enjoyable, and feel no responsibility to the student other than to present the material to them. Spitze (94) concurred that students who find pleasure in the learning situation are more likely to continue learning.

4) For learning to occur, affects as well as cognition must be involved. Williams (7) assessed pupil-teacher behaviors related to a cognitive affective teaching model and concluded that pupil-teacher interactions dealing particularly with cognitive and affective behaviors are vitally responsible for releasing creative potential. Knowledge

alone does not guarantee logical and mature behavior. All behavior is the result of a combination of cognitive and affective factors.

5) For learning to occur, a significant human relationship must exist. Mager (63) stated "things surrounded by unpleasantness are seldom surrounded by people." This educator is convinced that a major role of any instructor is to influence students to learn more about your favorite subject after they have left you. Mager has encountered situations where people were taught to dislike and then to avoid the very subject being taught.

6) For learning to occur, the learner must feel respected. Mager (63) listed numerous comments interviewees made about teacher practices believed to have a positive influence on their interest. Two of the comments are as follows: "He asked, and respected, the opinion of students . . . even though he didn't always agree with them." "The instructor reinforced our desire to learn by giving us assistance and by showing a personal interest in what we were doing."

Correspondents for Co-ed magazine (18) were asked to state constructive criticisms and suggestions for improvement of home economics. Nine hundred and forty-six questionnaires

were tabulated. The sample was composed of high school students. All of the girls said that methods as well as materials should be updated in home economics classes. One hundred and thirty girls wanted fewer tests and notes, more field trips, and longer class periods. Anything with class participation appealed to them--demonstrations, student-taught lessons and laboratory work. Sargent (84) described learning as an active encounter and used a Chinese proverb to illustrate this point:

> I hear, and I forget
> I see, and I remember
> I do, and I understand.

In summary, management and motivation within the classroom, to be effective, will necessitate choosing techniques which provide active participation by students, the greatest degree of reality or concreteness, and which offer opportunities for achievement which in turn brings feeling of pleasure and success to the learners.

Psychological forces.--Contemporary social psychologists generally agree that before changes in attitudes or in value-related behavior can occur, there must be a felt need for such changes. To improve the eating habits of a teenager, the problem would concern an understanding of an adequate diet and the development of a desire to improve the diet.

The successful instructor will need a knowledge of psychological forces underlying attitudes and values.

According to Rosenstock (82), the eating patterns of people are largely determined by the family and cultural and social groups in which they live. Later, individual experiences alter eating habits. For most people, the patterns that develop early in life remain fairly stable throughout life and are notoriously difficult to change.

Pucinski (77) expressed the opinion that food habits can be considered adequate only when a person's current needs for nutrients and energy are met. Studies by Huenemann and others (49), Eppright (28), Metheny (68), and Stiebling (96) indicated that the adolescent teenager too often has an inadequate dietary pattern as a result of meal skipping, poor choice of snacks or participation in fad diets.

Ack (1) recommended immediate positive consequences as a means of accelerating changed behavior habits. When incentive is lacking, or results inconclusive, constructive achievement is less likely to result. Kintzer (55) affirmed that learning does not occur through mere repetition of an act or exposure to the right way to do a job. The desire to learn is essential. Spitze (94) maintained that results of

the learning process must be translated into a feeling of success. If there is ego involvement or if the student has a personal interest in the success of the technique, motivation and learning are increased.

From the standpoint of psychology, Ritchie (80) stressed that an understanding on the part of the instructor regarding the socio-economic status of the community and the social and cultural patterns of the students involved is basic to any motivation program. Taylor and Pye (100) challenged instructors to know their field, have an understanding of human psychology, and be able to motivate learners to improve their food habits.

PROBLEMS RELATED TO TEACHING OF NUTRITION

The nutrition teacher encounters several problems when teaching. Among these are food prejudices on the part of individuals, lack of motivation, and a shortage of qualified teachers.

Who turns the child "off" to nutrition.--Studies by Dickens (20) found that the mother, more than other factors, appeared to exert the greatest influence on food selection of the family members. Cultural, social, and economic status of the family influence food selection. Children who have

developed an unfriendly attitude toward the word "nutrition" present a challenging problem to the teacher. Blackburn (10) stated that the punitive attitude of some teachers, supposedly seeking to improve the nutritional health of the poor, may in reality be the chief factor in creating an active dislike for nutritional instruction on the part of children in poor or low income families.

Babcock (6) recommended that the food therapist explore the food habits of a sub-culture before making recommendations. The student from the poor family wants to be on a level with his peers and may feel insecure when confronted with food selection and purchasing outside his means. When the teacher questions food intake at the family level, the low-income student may prevaricate in order to avoid embarrassment. Snack items such as soda and potato chips are usually considered treats to the underprivileged. Blackburn (10) warned that banning these items in the interest of improved nutrition may build resentment against the program as a whole.

Lack of motivation.--Huenemann (50) asserted that motivation of teenagers to improve their nutrition would require understanding by all involved professionals. Teenagers must be involved in solving their own problems and the needs and

wants of this age-group must be considered. Spindler (93) listed a few concerns of importance to teenagers. These concerns include friendships, sociability, appearance, vigor and popularity. All of these interests or concerns could be related to food and nutrition. Spitze (94) recommended the use of teaching aids which required the use of two or more senses simultaneously.

Lack of qualified teachers.--Steinburg (98) reported a national study made in 1964 which illustrated the need for qualified teachers in the field of nutrition. One of the major conclusions was that in many cases pupils were being taught the same nutritional subject matter year after year without any appreciable changes. Unqualified teachers were listed as one of the main problems. The study revealed that the elementary classroom teacher was the only person teaching nutrition to students at this level. Most health classes at the junior high school level were taught by teachers with a combination major of health and physical education. In large and medium sized high school districts, 10 per cent of the classes in nutrition were taught by teachers with degrees only in physical education. In smaller districts, 30 per cent of the health classes were taught by teachers with no background in health or nutrition education.

Harper (44) suggested that the training of nutrition educators include a sound background in basic science but need not include the high degree of specialization required for a career in the science of nutrition. Training should include the practical aspects of nutrition and a knowledge of techniques to apply nutritional knowledge. The training would emphasize human relationships and communication in order that nutritional knowledge could be presented simply and clearly and effectively. Johnson (53) concurred that expert knowledge of nutrition is not necessary for a teacher to make others aware of the need for sensible eating. Nutrition instructors are challenged to educate first themselves and then others by their example.

Real-life experiences.--Tacionis and Rice (99) have found that home economics provides a special opportunity to perpetuate the early pattern of learning through sensory contact with material objects. The learner must be involved with the object in some action that utilizes the senses and becomes action-oriented. Spitze (94) contended that content taught should become a part of life instead of being separated from life. Pucinski (77) suggested that experiences might be a part of a vocational educational program as provided by the Vocational Education Improvement Act of 1967. This legislation was designed to provide facilities and

teachers for vocational training of high school students. Preparation for employment is the goal of this work-study program. Pre-employment education is offered in many junior high schools. The Vocational Education Act of 1963 provided funds for this program, planned to provide real-life experiences.

Projects within the home are suggested by Spitze (94) as valuable action projects for the purposes of practicing skills, using knowledge, and developing favorable attitudes to future roles. Work may also take place in hospitals, nursing homes, day care centers, churches, or a variety of other agencies and institutions. Teachers should guide students in learning from consumer experiences, personal care and resource management. Volunteer work within the community provides opportunities for young people to become acquainted with individuals who can have important positive influence on their development and on job opportunities later.

Well chosen field trips extend experience in areas of interest to the students and boost self-esteem when shared with those who have not had the same observations and travels. Preparation for events which are related to the everyday life of the student does not seem as "academic" as usual course content. Teachers who plan these learning

experiences are likely to feel highly rewarded. Students will need help in planning and evaluating projects and seeing the value of the things they learn.

Simulations of reality.--Simulation of reality does not pretend to be real, declared Spitze (94), but is sufficiently like reality to seem possible. Bogniard and Dalrymple (11) verified widespread use of this technique in industrial and military areas where it is not always practical to use real-life situations. The use of simulation in teaching allows boys and girls to act through situations before such situations must be faced in reality, and to evaluate the direct and long-range consequences of choices made.

Role playing, skits and pantomines can be used effectively. Spitze (94) recommended allowing students to act out a given situation to show emotional reactions and imagined behavior. Discussions are helpful and can be an inducement for participation for those too timid to role play. The success of discussion may well depend upon the extent to which feeling as well as thinking is involved and by preliminary techniques or devices that are used for stimulation. Emmer (26) studied 44 undergraduate students at the University of Texas to determine whether instructional behavior learned during a series of simulated teaching experiences using

peers as students would transfer to a setting in which "real" pupils were students. Characteristics of teaching performance acquired during simulated teaching with peers were contrasted with the same characteristics measured in lessons using real pupils. Results provided some evidence that instructional behavior acquired during simulated teaching with peers will transfer to a simulated setting using actual pupils as students.

Simulation can permit prospective student teachers to participate in classroom situations before they enter the actual teaching situation. Bogniard and Dalrymple (11) designed a study for this purpose at Ashland College. Seven prospective student teachers practiced their own classroom teaching for a period of two weeks. At the close of the experiment, 82 per cent of the students responded favorably toward the experiment. The instructional phase included the use of video taped incidents, practice sessions, individual and group discussions, and a written analysis of each problem.

Bell (8) conducted a similar study at Texas Tech University. Twenty-two home economics seniors volunteered to participate in the study. The primary purpose of this study was to determine the effect of microteaching upon specific

skills of student teachers. Statistical analysis of data gathered from the experiment indicated effective gains in teacher preparation through microteaching experience. Microteaching was shown to be a possible screening device for student teachers and also as a possible self-evaluation for students.

Games have become quite popular as a means of simulating real life action. To use games effectively, Spitze (94) suggested that the teacher should determine that the objectives are clear, that the time required to play the game is reasonable in terms of expected learning, that the experience creates interest, excitement, and enjoyment of learning, that the structure of the subject matter is retained, and that competition remain friendly.

Other forms of simulation include inquiry training, demonstrations, laboratory and experimentation and discussion. Reading, writing, and speaking can be classified as simulations of reality if done in connection with a simulation technique.

Abstractions from reality.--Abstractions from reality are commonly used techniques. Spitze (94) declared that abstractions, unfortunately, are very likely to be ineffective. Lecture was once considered to be a useful teaching

technique, but it rarely meets the criteria of ego involvement, concreteness, and participation of the learners.

Programed instruction is a procedure for self-instruction, self-pacing, and self-evaluation. Students who have experienced repeated failures may find needed reward, but the material is ultra-simple and boring to others.

Audio-tutorial instruction is self-instructional and stems from resource centers equipped with films, programed materials, tapes, and the like. Sisler (91) used this technique of teaching in a beginning clothing course and reported that the students had overwhelmingly favored the technique.

Shipman (87) reported the use of various techniques to improve motivation and communication and self-study aids to shorten the learning process. The long-range goal of this system is to encourage learners to develop abilities and attitudes that will help them continue to learn in any area after their formal education has ended.

Learning packages offer a great variety of possibilities. The packages consist of major concepts, behavioral objectives, suggested activities, and means of evaluation. Self-instruction and self-pacing is possible.

Other techniques which are considered abstractions from reality include examinations, supervised study, drill, reading, writing, and speaking. Spitze (94) has found that all can be used effectively, but student interest is usually lacking.

Individualized instruction.--The goal of education is to meet the needs of each student within the classroom. Every learner benefits from active participation in the learning process and a feeling of reward for this participation. Some students are better able than others to benefit from group instruction, but all learners respond favorably to individual assistance. According to Spitze (94), instruction can be individualized in heterogeneous classes if teachers can accept the idea that all students do not have to do the same thing in the same way at the same time. Students can be studying the same general concept yet engage in varying activities in the learning process.

Kapfer (54) recommended the preparation of learning packages or units as one key to providing individualized instruction. The pupil's responsibility is to learn and the teacher's responsibility is to provide learning materials for the pupils to study. At the same time, the subject matter of the course must be appropriate to the learner with

reference to the pace of instruction and the difficulty of the instructional material. The size of the group, the composition of the group, and the time allotted are all considerations that have to be teacher decisions.

Mitzell (69) listed five different concepts of individualization:

1) The learner is allowed to proceed through content materials at a self-determined pace that is comfortable for him.

2) The learner should be able to work at times convenient to him.

3) The learner should begin instruction in a given subject at a point appropriate to his past achievement.

4) Learners are inhibited by a small number of easily identifiable skills or knowledges which should be diagnosed and remedied through special instructional units.

5) The learner should be furnished with a wealth of instructional materials from which to choose.

Gibbons (39) warned that students accustomed to traditional schooling should not be expected to make an easy transition on such an enterprise as self-directed study. Training and supervision are necessary for a program involving new routines, responsibilities, instructional procedures, and relationships with faculty.

In concluding this review of literature relative to the need for improved diets in the United States, the

nutritional state of teenagers and the role of education in regard to teaching nutrition, attention is directed to a statement by McFarland (61), Chairman of the Board and Executive Officer of General Mills, to the National Nutrition Education Conference:

> Some people obviously are malnourished because they can't afford to buy the necessary food; this is an economic problem. Some people are malnourished even though they have the money; they don't know what to buy. This is an educational problem. But many people are malnourished even though they have the money and know what to buy; they just don't care about good nutrition. This is a motivational problem. Attacking it may well call for dramatic new approaches in the years ahead.

CHAPTER III

P R O C E D U R E

THE SAMPLE FOR THE STUDY

The sample for the study consisted of 160 teachers of secondary school homemaking who were employed at the time of the study. Names and addresses of the sample were obtained from both city and state supervisors. Eighteen letters were originally mailed to city and state supervisors. The letters were sent to explain the purpose of the study and to ask the supervisor to send names and addresses of 20 teachers from their city or state. The letter explained that these teachers would be sent a questionnaire to complete and that the study concerned teaching of nutrition. Since the return of names was not as large as had been expected, 15 additional letters were sent to supervisors from other states. The final sample was from 15 different states, chosen to represent a wide geographic range. Three hundred questionnaires were mailed to teachers on January 2, 1972.

The states which comprised the sample are: 1) Florida, 2) Iowa, 3) Kansas, 4) Kentucky, 5) Minnesota, 6) Mississippi, 7) New Jersey, 8) New Mexico, 9) Nevada, 10) Pennsylvania,

11) Tennesse, 12) Texas, 13) Utah, 14) Washington, and 15) Wisconsin. The number returned from each state is not known since the questionnaire did not ask for the name or address of the school.

THE INSTRUMENT FOR THE STUDY

The instrument for the study was motivated by and based on the booklet written by Spitze (94) Choosing Techniques for Teaching and Learning. The booklet is a publication of the Home Economics Education Association.

The instrument was composed of a data sheet concerning the teacher and her situation, a list of teaching devices and a list of teaching techniques. A cover letter was enclosed which explained the purpose of the study. Copies of the letters are contained in Appendices B and C. The instrument was four pages in length and had been professionally printed on a folded sheet. The appearance of the type, the simplicity of the lay-out and the ease of handling were believed to be factors which would result in a high percentage of returned questionnaires.

The section concerning the teacher situation collected background information about the teachers. The name of the teacher and the name of the school were not requested.

The second part of the instrument listed eight teaching devices that were chosen to represent recent approaches to teaching. Respondents were to check the frequency of use of these teaching devices. One column was included for the teachers to indicate if the device was available for use.

The third part of the instrument was composed of teaching techniques which were planned for behavioral change when teaching nutrition education. Twenty-four techniques were listed under four main classifications. The classifications included the following: 1) Real life experiences, 2) Simulations of reality, 3) Abstractions from reality, and 4) Individualized instruction. Six techniques were listed for each classification and were explained for clarification. Teachers were requested to indicate whether or not they used each of the techniques and to rate the effectiveness of the techniques used when behavioral change was the goal. Effectiveness was rated as "very effective," "fairly effective," "ineffective," or "no evidence." Teachers were also asked to indicate the size of class preferred for each teaching technique.

THE COLLECTION OF THE DATA

Data were collected by mail. Three hundred questionnaires were mailed to secondary homemaking teachers in 15

different states. Twenty instruments were sent to each state. Each packet consisted of a cover letter which explained the purpose of the study, the questionnaire which was to be completed and returned, and a self-addressed envelope for the return of the questionnaire. Teachers were asked to return the questionnaires by January 15, 1972. A copy of the questionnaire is included in Appendix D.

TECHNIQUES OF DATA ANALYSIS

Teacher situation was analyzed appropriately to the purposes of the study. Background information for the respondents included total number of years taught; the number of years teachers had taught nutrition education; academic training; kind and number of professional magazines read; grade levels taught and college courses completed in the areas of food and nutrition. Three questions asked for opinions regarding nutrition as related to the students they taught.

Teaching devices were analyzed to determine frequency of use and availability of the listed devices. Teaching techniques were analyzed to determine which techniques had been used and the effectiveness rating of the techniques used toward the goal of achieving improved eating habits.

Comparisons were made as follows:

1) Ten variables were selected and statistical correlations were determined for each variable. Five of the variables concerned the educational background of the respondent; five concerned the use and effectiveness of teaching techniques (Table IX).

2) Analysis of variance was determined relating total teaching experience to each of the other selected variables (Table X).

3) Teaching experience was grouped for analysis of difference. T-values were determined for the groups compared (Table XI).

Data were tested at the 0.05 and at the 0.01 level of significance. Tables IX, X and XI are presented in Chapter IV.

CHAPTER IV

PRESENTATION AND ANALYSIS OF DATA

Studies in the field of nutrition indicate a wide gap between the study of nutrition and the practice of nutrition. Behavioral objectives have been advocated by many educators as a means of changing behavior patterns. Emphasis on goals to be attained by each individual student has been recommended as a successful means of bringing about desired changes. Eating habits are very personal; every person has developed an individual like or dislike for various foods. People tend to eat foods they like rather than select foods which are nutritionally best for their bodies. Studies indicate that teenagers engage in several undesirable food practices. The results of long-term inadequacies are believed to be serious enough to merit the increased efforts of all who are interested in the health of this and succeeding generations.

Within recent years attention has been focused more and more on the techniques of instruction. Authors of studies concerning nutrition education conclude that students have not found the study of nutrition interesting.

The first general objective of the study by this investigator was to present and evaluate some innovative techniques of teaching nutrition. The second general objective was to survey instructional practices of a group of randomly selected secondary school homemaking teachers.

The sample for the study was composed of 160 secondary school homemaking teachers presently employed in 15 states within the United States. The states represented were selected to represent varying geographic locations. Names of teachers to receive the questionnaire were selected from requested lists obtained from city and state supervisors of home economics. Some supervisors sent the names of 20 teachers, as requested; others sent larger lists; a few sent a state directory. Names were randomly chosen from those lists containing more than 20 names.

A cover letter explaining the purpose of the study and a self-addressed return envelope accompanied the questionnaire. An effort was made to word both the letter and the questionnaire in order that responses would not be influenced. Letters to the supervisors and teachers are included in the Appendices A, B, and C.

The questionnaire was based on suggestions contained in a booklet written by Spitze, Choosing Techniques for

Teaching and Learning. The booklet was published by the Home Economics Education Association, an affiliate of the National Education Association. The four classifications of techniques were used as presented in the publication, but six specific techniques were chosen from a larger number to represent each of the four classifications. Techniques chosen for the study to be reported were related to teaching nutrition education. Teachers were requested to check the techniques they had used and to rate the effectiveness of the techniques used when the goal was improved food habits.

TEACHER SITUATION

Teaching Experience

One portion of the questionnaire was related to the teacher and her situation. Two questions asked for personal opinions. Two groupings of total teaching experience and nutrition teaching experience were presented. The first grouping had five divisions; the second had three groupings and was used for statistical analysis (Table I).

Fifty-five per cent of the teachers had taught fewer than 10 years. Eighty-two per cent of the sample had taught fewer than 20 years. Fewer than 5 per cent of the teachers

TABLE I

TEACHING EXPERIENCE AS REPORTED BY 160 HOME ECONOMICS TEACHERS IN SECONDARY SCHOOLS

Teaching Experience in Years	Responses	
	Number	Per cent
Total Teaching Experience		
Initial Grouping		
1 - 9 years	89	55.3
10 - 19 years	42	26.7
20 - 29 years	21	13.1
30 - 39 years	6	3.7
40 years or more	2	1.2
Final Grouping for Analysis		
1 - 5 years	61	37.9
6 - 15 years	58	36.6
16 years or more	41	25.5
Teaching Nutrition		
Initial Grouping		
1 - 9 years	92	57.5
10 - 19 years	45	28.1
20 - 29 years	19	11.9
30 - 39 years	4	2.5
40 years or more	0	0.0
Final Grouping for Analysis		
1 - 5 years	70	43.5
6 - 15 years	54	34.2
16 years or more	36	22.3

had taught more than 30 years. The mean number of years teaching experience was 11.08.

Most of the teachers had taught nutrition as a part of the homemaking curriculum. The difference between total years teaching experience and years experience teaching nutrition was not great enough to justify separate analysis of data. The responses are included for comparison. Teachers with more than 15 years teaching experience composed the group which had taught outside the field of homemaking.

Academic Training

Ninety-five of the sample reported the completion of the Bachelor's degree; several of this group indicated the completion of additional college hours. Thirty-four teachers held the Master's degree with no work beyond this level. Thirty respondents had completed work beyond the Master's degree (Table II).

As expected, the majority of teachers holding only Bachelor's degrees had taught one to five years. Five of this group of teachers, 8.5 per cent, held Master's degrees. Three teachers, 1.5 per cent, reported work beyond the master level.

TABLE II

EDUCATIONAL BACKGROUND OF 160 HOME ECONOMICS TEACHERS IN SECONDARY SCHOOLS

Educational Information	Responses	
	Number	Per cent
Academic		
Bachelor's degree	95	59.0
Master's degree	34	21.0
Hours beyond Master's degree	30	18.8
No responses	2	1.2
College Courses in Nutrition		
Basic Nutrition	158	98.1
Advanced Nutrition	92	57.1
Diet Therapy	16	9.9
Bionutrition	14	8.7
Others	31	19.3
College Courses in Foods		
Principles of Food Preparation	154	95.7
Meal Management	150	93.2
Experimental Foods	81	50.3
Others	19	11.8
Professional Workshops		
City directed	49	31.1
Area directed	59	36.6
State directed	102	63.4
College directed	46	28.6
Professional organization	72	44.7
Professional Magazines		
Forecast for Home Economics	159	99.4
Illinois Teacher for Contemporary Roles	51	31.7
Journal of American Dietetic Association	12	7.5
Journal of Home Economics	114	70.8
Journal of Nutrition Education	18	11.2
What's New in Home Economics	68	42.5
Others	92	57.1
Grade Level of Teaching		
Sixth grade	4	0.8
Seventh grade	34	6.5
Eighth grade	38	7.2
Ninth grade	95	18.1
Tenth grade	108	20.6
Eleventh grade	122	23.3
Twelfth grade	123	23.5

The percentage of teachers holding Master's degrees increased as teaching experience increased. One teacher who had taught between 6 and 15 years held two degrees, each a Master's degree with majors in English and Library Service. No college work in homemaking had been completed. Sixteen teachers, 27.1 per cent, who had taught 6 to 15 years, held Master's degrees. Eight teachers, 13.6 per cent, had completed work beyond the Master's level.

Teachers with 16 years or more experience had the best academic records. Nine of this group, 22.0 per cent,held Bachelor's degrees; 13 teachers, 31.7 per cent, held the Master's degree; 19 teachers, 46.3 per cent, had completed work beyond the Master's degree.

College Courses Completed

A list of four nutrition courses and three foods courses were presented for the sample group to check. Blanks were provided for teachers to add courses not on the list (Table II).

One hundred and fifty-eight teachers, 98.1 per cent, had completed Basic Nutrition; 92 teachers, 57.1 per cent, had also completed Advanced Nutrition; 16 teachers, 9.9 per cent, had taken Diet Therapy; 31 teachers, 19.3 per

cent, mentioned other nutrition courses they had taken in college.

One hundred and fifty four, 95.7 per cent, of teachers had college credit for Principles of Food Preparation; 150 teachers had completed Meal Management. Eighty-one teachers, 50.3 per cent, had taken Experimental Foods; 19 teachers, 11.8 per cent, named other foods courses completed in college.

Professional Workshops or In-service Meetings

Teachers were requested to report the number of workshops or in-service meetings attended within the past year. Sixteen of the sample failed to respond or else attended no meetings listed. Some teachers failed to indicate the number of meetings attended, as requested, and placed a check-mark by the type of meeting. For analysis, a check mark was interpreted as representing attendance at one workshop in or-service meeting (Table II).

The highest percentage of teachers attended state-sponsored workshop or in-service meetings. A total of 102 teachers attended 128 state-sponsored meetings. Seventy-two teachers attended 102 meetings sponsored by professional organizations. Fifty-nine teachers attended 83 area-

sponsored meetings. Forty-nine teachers attended 126 city-sponsored meetings and 46 teachers attended 78 college-sponsored meetings. The sample group attended a total of 465 meetings. The mean for workshop or in-service meeting attendance was 3.5 meetings.

Professional Magazines Read

Five professional magazines were selected to determine the amount of professional reading done by the respondents. A sixth magazine was inadvertently omitted when the questionnaire was printed. The omitted magazine, What's New in Home Economics, was added by 42.5 per cent of the respondents. Forecast for Home Economics was read by all except one respondent. One hundred and fourteen teachers indicated that they read the Journal of Home Economics; 51 teachers read the Illinois Teacher for Contemporary Roles; 18 teachers read the Journal of Nutrition Education; 12 teachers read the Journal of the American Dietetic Association. Ninety-two magazines were mentioned in addition to those listed: What's New in Home Economics was deleted from this total and independently counted as shown in Table II.

Grade Level of Teaching

The questionnaire asked for "grade level you teach." Responses appeared to indicate a lack of consistency in

interpretation since some teachers checked all seven grade levels listed. Based on responses, 76 classes composed of sixth, seventh, and eighth grade students were being taught. One hundred and twenty-three teachers reported teaching grade 12; 122 teachers were teaching grade 11; 108 teachers were teaching grade 10; and 95 were teaching grade nine (Table II).

Need for Improved Eating Habits

Respondents were instructed to check whether or not they thought the majority of their students needed to improve their eating habits. One hundred and fifty teachers, 93.2 per cent, answered "Yes." One teacher noted that she taught boys and thought their eating habits were good. Another teacher commented on the general health conditions of the student body as a whole and reported few apparent dietary inadequacies. These two responses composed two of the seven negative responses to the question. Two teachers checked the response "do not know" (Table III).

Research Regarding Dietary Patterns

Information was requested regarding any research the teachers had conducted to determine the dietary patterns of students. One hundred and eleven teachers, 68.9 per cent, responded positively. Few teachers explained the

TABLE III

INFORMATION CONCERNING NUTRITION AS REPORTED BY 160 HOME ECONOMICS TEACHERS IN SECONDARY SCHOOLS

Question	Responses		
	Yes	No	Do Not Know
Do you think that the majority of your students need to improve their eating habits?			
Number	150	7	2
Per cent	93.2	4.3	1.2
Have you done any research in regard to dietary patterns of the students you teach?			
Number	111	47	3
Per cent	68.9	29.2	1.9
Do you feel that your students are stimulated during the study of nutrition?			
Number	103	41	13
Per cent	64.0	25.5	8.1

type of research they had conducted, but most who did explain had obtained and utilized dietary records from students. Several teachers indicated an interest in the school-lunch program and had observed eating habits of students. Only one teacher mentioned the use of animal studies for experimentation. Forty-seven respondents, 29.2 per cent, responded negatively regarding research; three did not respond (Table III).

Stimulation of Students

The homemaking teachers were asked to indicate whether or not they felt their students were stimulated during the study of nutrition. Data from the question does not appear consistent with data regarding the effectiveness of techniques. One hundred and three teachers, 64 per cent, answered positively regarding stimulation of students, yet only six of the teaching techniques were rated as "very effective" by more than 50 per cent of the respondents.

Forty-one teachers responded negatively regarding stimulation of students when studying nutrition. Some of this group wrote comments regarding their problems. Several of the comments reflected a lack of interest on the part of the teacher; some teachers admitted they did not feel qualified to teach nutrition effectively; most comments

were related to lack of student interest. Thirteen instructors did not know if students were stimulated during the study of nutrition (Table III).

Use of Teaching Aids

Table IV contains the list of eight teaching devices and responses regarding frequency of use. Information regarding audio-visual devices was sought in order to gain some insight into the teaching methods used.

Filmstrips were the most used of all teaching devices listed. One hundred and fifty-one teachers, 93.8 per cent, reported using filmstrips at least once during the study of nutrition. Only four teachers checked "never use" and only three reported "not available."

The transparency projector was used by 134 teachers at least once during the unit. The percentage who used this device was 88.3 per cent in contrast to 8.1 per cent who never used transparencies. Eleven teachers did not have a transparency projector available for use.

Ninety-one teachers used phonograph records as a teaching aid. Several respondents commented that the records accompanied filmstrips. Forty teachers indicated never using records; 11 teachers did not have them available.

TABLE IV

USE OF AUDIO-VISUAL DEVICES BY 160 HOME ECONOMICS TEACHERS IN THE SECONDARY SCHOOL

Device	Frequency of Use				
	Daily	Weekly	Once during Unit	Never Use	Not Available
Tape recorder	1	8	52	66	10
Transparency projector	8	60	66	13	3
Filmstrips	4	92	55	4	3
Opaque projector	1	18	55	48	18
Phonograph records	0	36	55	40	11
Slides	0	24	50	37	29
Television	0	6	17	46	65
Programmed instruction	4	11	27	45	51

The 56.6 per cent of teachers who used records may have been referring primarily to those sent with filmstrips.

Seventy-four instructors, 46 per cent, used opaque projectors and slides for instructional aids. The opaque projector was never used by 29.8 per cent of the teachers; 18 did not have an opaque projector available. Slides were never used by 23 per cent of the teachers; 29 teachers indicated this equipment was not available.

Programmed instruction was used by 42 respondents, 26.1 per cent. Twenty-eight per cent of the teachers never used this teaching aid; 51 teachers indicated programmed instruction was not available.

Television was the teaching aid used less often than any of the eight devices listed. Only 23 teachers, 14.3 per cent, used television. Forty-six teachers, 28.6 per cent, indicated that they never used television; 65 teachers, 40.4 per cent, did not have television available for use.

Only 10 teachers indicated that a tape recorder was not available, but 66 teachers, 41 per cent, said they never used a tape recorder. Sixty-one teachers, 37.9 per cent, indicated the use of a tape recorder at least once during the teaching of nutrition.

Use of Real Life Experiences

Real life experiences were used by fewer teachers than any of the four classifications of teaching techniques. The mean use was 3.2 techniques (Table V).

Only 49 teachers reported the use of paid or volunteer work as a teaching technique. Ninety-five teachers, 59.0 per cent, had not used paid or volunteer work for teaching and learning; 17 teachers, 10.6 per cent, did not respond to the question. Based on percentage of those who did respond, 44.9 per cent of the teachers evaluated paid or volunteer work as being "very effective"' 49.0 per cent selected the rating "fairly effective"; 2.0 per cent deemed the technique "ineffective." Paid or volunteer work ranked ninth in the list of most effective techniques. Twenty-four techniques were listed, six examples from each of the four classifications of teaching techniques.

Family membership, involving home experiences, had been used by 110 teachers, 68.3 per cent. Thirty-six teachers, 22.4 per cent, had not used this technique; 15 failed to respond. Only 25.5 per cent of the teachers rated the use of family membership as a "very effective" technique; 64.5 per cent of the teachers checked the rating "fairly effective";

TABLE V

EFFECTIVENESS OF TEACHING TECHNIQUES (GROUP I) USED BY

160 HOME ECONOMICS TEACHERS IN SECONDARY SCHOOLS

Real Life Experiences	Techniques				Effectiveness							
	Used		Not Used		3		2		1		0	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Paid or volunteer work	49	30.4	95	59.0	22	44.9	24	49.0	1	2.0	4	4.1
Family membership	110	68.3	36	22.4	28	25.5	71	64.5	10	9.1	1	0.9
Personal health and appearance	141	87.6	11	6.8	46	32.6	80	57.0	8	5.7	7	4.7
Citizen participation	39	24.2	115	71.4	24	61.5	12	30.8	2	5.1	1	2.6
Observations and field trips	72	45.0	81	50.6	44	61.1	25	34.7	3	4.2	0	0.0
Preparation for events	89	55.3	61	37.9	29	32.6	52	58.4	3	3.4	5	5.6

3 = very effective
2 = fairly effective
1 = ineffective
0 = no evidence

9.1 per cent of the teachers considered family membership to be an "ineffective" technique. The low rating of effectiveness placed family membership 20 in the list of 24 techniques.

Personal health and appearance was the third real life experience listed. A notation described this teaching technique as "student assesses need and is guided toward self-improvement." One hundred and forty-one respondents, 87.6 per cent, had used this technique for teaching. Eleven teachers, 6.8 per cent, had not used personal health and appearance for achieving goals; nine teachers did not respond to the question.

Approximately one-third of those who had used personal health and appearance of the student to motivate learning evaluated the effort as being "very effective"; 80 respondents, 57.0 per cent, described the technique as being "fairly effective"; eight teachers, 5.7 per cent, considered the method to be "ineffective."

Citizen participation was described as the use of "projects selected for student participation, such as assistance at nurseries, teaching nutrition to lower grades, and the like." This was the least used of the 24 techniques listed; however, the effectiveness of citizen participation was

ranked as 2.5 in the list of 24 techniques. The use of citizen participation was considered to be "very effective" by 61.5 per cent of the teachers who had used the technique. "Fairly effective" was the term chosen by 30.8 per cent of the teachers; 5.1 per cent of the teachers rated their use of the technique to be "ineffective."

Observations and field trips were rated as the most effective teaching technique of the 24 listed. The questionnaire described this method as one where students observe real life situations which serve to broaden awareness. Less than 50 per cent of the sample had used field trips and observations for teaching and learning; however, 61.1 per cent of the teachers who had used the technique rated the effort as being "very effective." Twenty-five respondents, 34.7 per cent, rated the method as "fairly effective"; only 4.2 per cent of the teachers had found this technique to be "ineffective."

Preparation for events such as exhibits at a county fair, preparation of display cases, appearance on television or radio, or preparation of articles for the school newspaper was the sixth technique listed in the group classified as real life experiences. Eighty-nine teachers had used the technique; 61 had not involved students in activities such

as these; 11 did not respond. Twenty-nine teachers, 32.6 per cent, considered preparation for events to be "very effective"; 52 teachers, 58.4 per cent, checked the rating "fairly effective"; three teachers, 3.4 per cent, judged the technique to be "ineffective."

Simulations of Reality

Simulations of reality for teaching and learning were described as "pretense that is enough like reality to seem possible." The mean use of the six techniques representing simulations of reality was 4.29, as shown in Table VI.

One hundred and seventeen teachers, 73.1 per cent, had used role playing as a teaching technique. Role playing involves students acting out given situations without rehearsal. Fifty-four teachers, 46.1 per cent, rated the technique as "very effective"; the term "fairly effective" was selected by 51, 43.6 per cent, of the sample; 9.4 per cent of the teachers had found role playing to be "ineffective." Role playing ranked fifth in the list of most effective techniques. Thirty-eight respondents, 23.8 per cent, had not used role playing; five did not respond to the question.

Data indicated that skits and pantomime had been used by 92 teachers, 57.5 per cent. Sixty-one teachers, 38.1

TABLE VI

EFFECTIVENESS OF TEACHING TECHNIQUES (GROUP II) USED BY

160 HOME ECONOMICS TEACHERS IN SECONDARY SCHOOLS

Simulations of Reality	Techniques				Effectiveness							
	Used		Not Used		3		2		1		0	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Role playing	117	73.1	38	23.8	54	46.1	51	43.6	11	9.4	1	0.9
Skits and panto-mime	92	57.5	61	38.1	33	35.9	49	53.3	7	7.6	3	3.2
Games	133	83.1	24	15.0	69	51.9	52	39.1	8	6.0	4	3.0
Demonstrations	143	89.4	15	9.4	86	60.1	54	37.7	2	1.5	1	0.7
Laboratory and experimentation	63	38.1	90	56.3	36	57.1	21	33.3	6	9.5	0	0.0
Discussion	143	89.4	11	6.9	43	30.0	88	61.5	7	4.8	5	3.7

3 = very effective
2 = fairly effective
1 = ineffective
0 = no evidence

per cent, had not used the technique; seven did not respond. Skits and pantomime were described as being "designed to dramatize a situation; written by teacher, students, or secured from another source; some rehearsal needed." Thirty-three respondents, 35.9 per cent, described skits and pantomimes as being "very effective"; 49 teachers, 53.3 per cent, rated the technique as "fairly effective"; seven teachers, 7.6 per cent, considered skits and pantomime to be "ineffective"; three teachers indicated"no evidence."

Games for teaching and learning were reported as a technique used by 133 teachers, 83.1 per cent. Twenty-four teachers, 15 per cent, had not used games; three did not respond. Approximately 52 per cent of the teachers using games had found the use to be "very effective"; 39 per cent selected the rating "fairly effective"; 6 per cent believed the use of games had been "ineffective." Games were rated sixth in the list of most effective techniques.

Demonstrations given by students, teacher, or resource person to present ideas or processes or to provide opportunity to experience attitudes or feeling had been used by 143 teachers, 89.4 per cent. Of this number, 60.1 per cent of the teachers rated demonstrations as being "very effective"; 37.7 per cent of the teachers selected the rating

"fairly effective"; only two teachers, 1.5 per cent, had found games to be "ineffective." Demonstration was ranked fourth in the list of most effective techniques and was also rated as the teaching technique least likely to be ineffective.

Laboratory and experimentation involving animals or laboratory and experimentation involving students had been used by only 63 teachers, 38.1 per cent. The low percentage of use was in contrast to the high rank of five in the list of most effective teaching techniques of the 24 examples listed. Thirty-six teachers, 57.1 per cent, who had used laboratory and experimentation rated the technique as being "very effective." Twenty-one teachers, 33.3 per cent, selected the rating "fairly effective"; six teachers, 9.5 per cent, had found the technique "ineffective."

Discussion was the sixth example of a teaching technique classified as simulations of reality. Discussion was defined as "key questions are planned to guide discussion, goals are clear to all; may involve whole group, panel, debate, case studies, provocative questions." One hundred and forty-three teachers, 89.4 per cent, had used discussion for teaching and learning. Of this number, only 30.0 per cent of the teachers believed this technique to be "very

effective"; 88 teachers, 61.5 per cent, rated discussion as being "fairly effective"; seven teachers, 4.8 per cent, described discussion as "ineffective"; five teachers indicated no evidence of effectiveness.

Abstractions from reality

Abstractions from reality was described as "any reading, writing, or speaking that is not seen by the student as a part of his everyday life, or of a simulation of life in which he is interested." The six examples of techniques included lecture, recitation, programmed instruction, learning packages, supervised instruction and examinations (Table VII). Respondents reported extensive use of lecture, recitation, supervised study and examinations. Only one-fourth of the sample group had used learning packages or programmed and audio-tutorial instruction. Even though more than 90 per cent of the teachers reported using lecture, recitation, supervised study and examinations, these four techniques received the lowest ratings in the list of most effective techniques.

Data revealed that recitation was believed to be the least effective of the 24 techniques investigated. Recitation was described as a question and answer session in which the teacher asked the questions and recall type questions

TABLE VII

EFFECTIVENESS OF TEACHING TECHNIQUES (GROUP III) USED BY 160 HOME ECONOMICS TEACHERS IN SECONDARY SCHOOLS

Abstractions from Reality	Techniques				Effectiveness							
	Used		Not Used		3		2		1		0	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Lecture	150	93.8	5	3.1	29	19.3	94	62.7	21	14.0	6	2.0
Recitation	151	94.4	5	3.1	23	15.2	85	56.3	38	25.2	5	3.3
Programmed instruction	41	25.6	111	69.4	8	19.5	23	56.1	7	17.1	3	7.3
Learning packages	43	26.9	111	69.4	12	27.9	24	55.8	4	9.3	3	7.0
Supervised study	146	91.3	12	7.5	39	26.7	87	59.6	17	11.6	3	2.1
Examinations	151	94.4	2	1.3	25	16.6	103	68.2	20	13.2	3	2.0

3 = very effective
2 = fairly effective
1 = ineffective
0 = no evidence

were used. Only 23 of the 151 teachers who reported using this technique considered the effort as being "very effective"; 85 instructors, 56.3 per cent, checked the term "fairly effective"; 38 teachers, 25.2 per cent, evaluated recitation as being "ineffective."

Examinations, required by some schools as a means of assigning grades, were used by 151 of the respondents, 94.4 per cent. Two teachers, 1.3 per cent, had not used examinations. Twenty-five teachers, 16.6 per cent, had found the use of examinations to be "very effective"; 103 teachers, 68.2 per cent, checked the rating "fairly effective"; 20 teachers, 13.2 per cent, considered examinations as being "ineffective."

Lecture had been used by 150 or 93.8 per cent of the respondents; five respondents, 3.1 per cent, had not used lecture for teaching. The use of lecture was rated "very effective" by 29 teachers, 19.3 per cent; "fairly effective" by 94 teachers, 62.7 per cent; "ineffective" by 21 teachers, 14 per cent of the sample group.

Supervised study was used by 146 teachers, 91.3 per cent of the sample; 12 teachers, 7.5 per cent, had not used supervised study as a teaching technique. Thirty-nine teachers, 26.7 per cent, had found supervised study to be

a "very effective" technique; 87 teachers, 59.6 per cent, rated the technique as "fairly effective"; 17 instructors, 11.6 per cent, selected the rating "ineffective."

Only 43 teachers, 26.9 per cent, had used learning packages for instruction. The questionnaire described learning packages as "consists of major concepts, behavioral objectives, suggested activities, and a means of evaluation. Learning packages are planned by the teacher, contain specific and detailed instructions for the student--prepared for self-teaching at a student's own rate." Twelve instructors, 27.9 per cent, rated learning packages as being "very effective"; 24 teachers, 55.8 per cent, rated the method of instruction as being "fairly effective"; four teachers, 9.3 per cent, had found learning packages to be "ineffective."

Forty-one teachers, 25.6 per cent, reported the use of programmed instruction, computor-assisted instruction, or audio-tutorial instruction. This was the second-least-used technique listed in the questionnaire. Eight teachers, 19.5 per cent, described the technique as being "very effective"; 23 teachers, 56.1 per cent, described the technique as being "fairly effective"; seven teachers, 17.1 per cent, evaluated programmed instruction, and the like, to be "ineffective."

Individualized Instruction

The questionnaire described individualized instruction as a teaching method in which students work individually or in small groups which change frequently according to individual interests, talents, and needs. Six examples of individualized instruction had a mean use of 3.81 (Table VIII).

One hundred and thirty-seven teachers reported the use of total group planning as a teaching technique; 19 teachers had not used this technique; four did nor respond to the question. Sixty-seven respondents, 48.6 per cent, evaluated the technique as being "fairly effective"; 52 teachers, 37.6 per cent, believed the technique to be "very effective"; 14 teachers, 10.1 per cent, considered the use of total group planning to be "ineffective."

The second example of a teaching technique classified as individualized instruction was described as smaller groups planning to report to the class on topics. One hundred and thirteen teachers had used the technique; 41 had not used this method; six failed to answer the question. The rating for effectiveness was approximately the same for the use of small groups as was reported for total group planning. Thirty-nine teachers, 34.5 per cent, evaluated

TABLE VIII

EFFECTIVENESS OF TEACHING TECHNIQUES (GROUP IV) USED BY

160 HOME ECONOMICS TEACHERS IN SECONDARY SCHOOLS

Individualized Instruction	Techniques				Effectiveness							
	Used		Not Used		3		2		1		0	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Total group planning	137	85.6	19	11.9	52	37.6	67	48.6	14	10.1	5	3.7
Group reports	113	70.6	41	25.6	39	34.5	54	47.8	15	13.3	5	4.4
Group skits	73	45.6	82	51.3	31	42.5	37	50.7	5	6.8	0	0.0
Posters for exhibit	101	63.1	54	33.8	43	42.6	48	47.5	9	8.9	1	0.1
Student preparation of nutritious snack foods	122	76.3	34	21.3	75	61.5	43	35.2	2	1.6	2	1.6
Preparation of displays	65	39.4	85	53.1	31	47.7	31	47.7	2	3.1	1	1.5

3 = very effective
2 = fairly effective
1 = ineffective
0 = no evidence

the technique as being "very effective"; 54 teachers, 47.8 per cent, indicated the rating as being "fairly effective"; 15 teachers, 13.3 per cent, had found small group reports to be "ineffective."

Seventy-three instructors had used skits, prepared by groups of students, as a technique for teaching and learning. Eighty-two teachers had not used skits; five of the sample group did not respond. Thirty-one of the 73 teachers who had used skits rated the effort as "very effective"; 37 teachers had found the use of skits to be "fairly effective"; five teachers rated skits as "ineffective."

Student preparation of posters for exhibit had been used by 101 teachers. Fifty-four instructors had not used posters as a teaching technique; five did not respond. Forty-three of the 101 teachers, 42.6 per cent, rated student preparation of posters as being "very effective"; 48 teachers, 47.5 per cent, selected the rating "fairly effective"; nine teachers, 8.9 per cent, had considered the technique as "ineffective."

Preparation of nutritious snack foods, serving class members and pointing out the contribution these foods can make toward achieving a well-balanced diet was ranked 1.5 in the list of most effective teaching techniques. The

high rating was consistent since this technique was ranked 21 in the list of 24 least effective techniques.

One hundred and twenty-two teachers had involved students in the preparation of snack foods. Of this number, 75 teachers, 61.5 per cent, believed the involvement had been "very effective" as a learning technique. Forty-three instructors, 35.2 per cent, checked the rating "fairly effective"; two teachers, 1.6 per cent, had found preparation of snacks to be "ineffective."

The sixth example of individualized instruction concerned the preparation of a display by students. Only 65 teachers had used this teaching technique; 85 had not; 10 did not respond. Even though a low percentage of teachers, 41 per cent, had used the preparation of displays for teaching, the technique was rated quite favorably. Thirty-one instructors, 47.7 per cent, had found involving students in preparing a display to be "very effective"; the same number and percentage rated this technique as "fairly effective"; two respondents, 3.1 per cent, considered the technique to be "ineffective." Four respondents indicated "no evidence" of effectiveness. Student preparation of a display was ranked seven in the list of most effective teaching techniques. The rating was consistent since the rating was 20 in the list of least effective techniques investigated.

Two of the examples of individualized instruction had been used by a rather low percentage of teachers; however, the classification had a mean use of 3.81 techniques. The effectiveness rating for individualized instruction was also favorable. Forty-five per cent of the teachers evaluated the techniques as being "very effective," while only 7.9 per cent of the teachers considered the techniques to have been "ineffective."

Summary of Four Classifications of Teaching Techniques

Data revealed that simulations of reality were used by more teachers than any of the other groups of teaching techniques (Table IX). Abstractions from reality were used almost as extensively as simulations of reality. Total responses for these two groups were 689 and 682, respectively. Total responses for individualized instruction and real life experiences were 609 and 498, respectively.

Simulations of reality received the highest rating for effectiveness. Based on the teachers who used the techniques, 47.4 per cent rated simulations of reality as being "very effective." Individualized instruction was rated "very effective" by 45.3 per cent of the teachers who used the techniques; real life experiences were rated "very

TABLE IX

EFFECTIVENESS OF FOUR GROUPS OF TEACHING TECHNIQUES USED BY 160 HOME ECONOMICS TEACHERS IN SECONDARY SCHOOLS

Classifications	Techniques		Effectiveness			
	Used	Not Used	3	2	1	0
Real Life Experiences	498	366	193	264	27	24
Simulations of Reality	689	239	321	315	41	12
Abstractions from Reality	682	246	136	416	107	25
Individualized Instruction	609	315	271	280	47	15

3 = very effective
2 = fairly effective
1 = ineffective
0 = no evidence

effective" by 39.8 per cent of the teachers who used the techniques; 20.6 per cent of the teachers who used abstractions from reality rated these techniques as "very effective."

Abstractions from reality received a rating of "ineffective" by 16.2 per cent of the teachers who had used abstractions for teaching techniques. The lowest rating for "ineffective" results, 3 per cent, was received by the group of techniques classified as real life experiences. Simulations of reality were considered "ineffective" by 6.1 per cent of the teachers who used these techniques; individualized instruction was rated "ineffective" by 7.8 per cent of the teachers who used these techniques.

STATISTICAL ANALYSIS OF DATA

The questionnaire was composed of four classifications of teaching techniques. Each of these four groups listed six examples of techniques illustrating the classification. A copy of the questionnaire is included in Appendix D. The four groups of teaching techniques were classified as real life experiences, simulations of reality, abstractions from reality and individualized instruction. Teachers were requested to indicate whether or not they had used each of the 24 examples of teaching techniques and to rate the

effectiveness of each technique when the goal was to improve the eating habits of students.

For statistical analysis, 10 variables were selected and relationships determined. The variables were the following:

1) Years teaching experience
2) Number of workshops or in-service meetings attended
3) Professional magazines or journals read
4) College nutrition courses completed
5) College foods courses completed
6) Use of teaching techniques based on real life experiences
7) Use of teaching techniques based on simulations of reality
8) Use of teaching techniques based on abstractions from reality
9) Use of teaching techniques based on individualized instruction
10) Total use of teaching techniques

Teaching Experience

When teaching experience was held constant, seven of the nine variables were significant at the 0.05 level. Two variables, attendance at workshops or in-service meetings

and the use of teaching techniques based on abstractions, were nonsignificant.

Statistical probability was determined comparing teachers with three groupings of teaching experience. For purposes of analysis, teaching experience was grouped as 1 to 5 years, 6 to 15 years, and 16 years or more. Each group was compared with the other.

Attendance at Workshops or
In-service Meetings

Correlation coefficients and analysis of variance were determined to analyze the effect of meeting attendance on other factors. Data revealed that attendance was nonsignificantly related to eight of the variables investigated. Workshop or in-service meeting attendance was significantly related to the use of teaching techniques based on real life experiences. The level of probability was at the 0.05 level of significance. The level of probability for all other variables was nonsignificant (Table X).

The mean for workshop attendance was used for 16 teachers who had not indicated attendance. Analysis of variance revealed a nonsignificant difference between workshop attendance and teaching experience (Table XI).

TABLE X

CORRELATIONS BETWEEN THE USE OF TEN SELECTED VARIABLES

Relationship between the use of total years teaching experience and nine selected variables

Variables	Rho	Probability
Workshops or in-service meetings	0.10	n.s.
Professional magazines read	0.23	P<.05
Nutrition courses completed	0.22	P<.05
Foods courses completed	0.24	P<.05
Real life experiences used	0.26	P<.05
Simulations of reality used	0.26	P<.05
Abstractions from reality used	0.17	n.s.
Individualized instruction used	0.35	P<.05
Total teaching techniques used	0.35	P<.05

Relationship between attendance at workshops or in-service meetings and nine selected variables

Variables	Rho	Probability
Professional magazines read	0.09	n.s.
Nutrition courses completed	0.16	n.s.
Foods courses completed	0.12	n.s.
Real life experiences used	0.21	P<.05
Simulations of reality used	0.01	n.s.
Abstractions from reality used	0.06	n.s.
Individualized instruction used	0.07	n.s.
Total teaching techniques used	0.09	n.s.

Relationships between number of professional magazines read and selected variables

Variables	Rho	Probability
Nutrition courses completed	0.38	P<.05
Foods courses completed	0.27	P<.05
Real life experiences used	0.27	P<.05
Simulations of reality used	0.19	n.s.
Abstractions of reality used	0.18	n.s.
Use of individualized instruction	0.26	P<.05
Total use of teaching techniques	0.30	P<.05

TABLE X (Continued)

CORRELATIONS BETWEEN THE USE OF TEN SELECTED VARIABLES

Relationship between college nutrition courses completed and selected variables

Variables	Rho	Probability
Foods courses completed	0.35	P<.05
Use of real life experiences	0.22	P<.05
Use of simulations of reality	0.16	n.s.
Use of abstractions from reality	0.16	n.s.
Use of individualized instruction	0.20	P<.05
Total use of teaching techniques	0.24	P<.05

Relationship between college foods courses completed and selected variables

Variables	Rho	Probability
Use of real life experiences	0.26	P<.05
Use of simulations of reality	0.16	n.s.
Use of abstractions from reality	0.19	n.s.
Use of individualized instruction	0.21	P<.05
Total use of teaching techniques	0.26	P<.05

Relationship between use of real life experiences and selected variables

Variables	Rho	Probability
Use of simulations of reality	0.50	P<.05
Use of abstractions from reality	0.38	P<.05
Use of individualized instruction	0.47	P<.05
Total teaching techniques used	0.78	P<.05

Relationship between the use of simulations of reality and selected variables

Variables	Rho	Probability
Use of abstractions from reality	0.38	P<.05
Use of individualized instruction	0.59	P<.05
Total teaching techniques used	0.79	P<.05

TABLE X (Continued)

CORRELATIONS BETWEEN THE USE OF TEN SELECTED VARIABLES

Relationship between the use of abstractions from reality and selected variables

Variables	Rho	Probability
Use of individualized instruction	0.39	P<.05
Total teaching techniques used	0.63	P<.05

Relationship between the use of individualized instruction and selected variables

Variables	Rho	Probability
Total teaching techniques used	0.84	P<.05

TABLE XI

ANALYSES OF VARIANCE FOR TOTAL TEACHING EXPERIENCE AND NINE SELECTED VARIABLES

Variables	Sum of Squares	Degrees Freedom	Variance Estimate	F-value	Probability
Workshop or in-service meetings					
Between	44.4979	2	22.2489	2.5964	n.s.
Within	1345.3519	157	8.5691		
Total	1389.8498	159			
Professional magazines read					
Between	25.0551	2	12.5275	5.1213	P<.01
Within	384.0449	157	2.4461		
Total	409.1000	159			
College nutrition courses					
Between	8.1086	2	4.0543	5.1220	P<.01
Within	124.2711	157	0.7915		
Total	132.3797	159			
College foods courses					
Between	7.2262	2	3.6131	6.5541	P<.01
Within	86.5488	157	0.5512		
Total	93.7750	159			

TABLE XI (Continued)

ANALYSES OF VARIANCE FOR TOTAL TEACHING EXPERIENCE AND NINE SELECTED VARIABLES

Variables	Sum of Squares	Degrees Freedom	Variance Estimate	F-value	Probability
Use of real life experiences					
Between	40.8261	2	20.4130	10.2092	P<.01
Within	313.9177	157	1.9994		
Total	354.7438	159			
Use of simulations of reality					
Between	21.0755	2	10.5377	6.4199	P<.01
Within	257.6995	157	1.6413		
Total	278.7750	159			
Use of abstractions from reality					
Between	9.1963	2	4.5981	4.8696	P<.05
Within	148.2475	157	0.9942		
Total	157.4438	159			
Use of individualized instruction					
Between	69.7208	2	34.8604	12.6500	P<.01
Within	432.6542	157	2.7557		
Total	502.3750	159			

TABLE XI (Continued)

ANALYSES OF VARIANCE FOR TOTAL TEACHING EXPERIENCE AND NINE SELECTED VARIABLES

Variables	Sum of Squares	Degrees Freedom	Variance Estimate	F-value	Probability
Total teaching techniques used					
Between	483.4280	2	241.7140	14.6830	P<.01
Within	2584.5410	157	16.4620		
Total	3067.9750	159			

Table XII data indicate that workshop or in-service attendance was not significantly different when teachers with 1 to 5 years experience were compared with teachers with 6 to 15 years experience. Means were 3.3 meetings for both groups. Teachers with 16 years or more experience did show a significant difference, at the 0.05 level, from the other two groups. Means indicated that teachers with 16 years or more experience attended more professional meetings. The mean attendance for the more experienced teachers was 4.5 meetings.

Professional Magazines

Reading of professional magazines was statistically related to six variables at the 0.05 level of significance (Table X). These variables include teaching experience, number of college nutrition and foods courses completed, total use of teaching techniques and the use of teaching techniques related to real life experiences. The use of individualized instruction was also affected by reading of professional magazines.

Analysis of variance indicated a significant difference between the number of years taught and the number of professional magazines read (Table XI). Teachers with 16 years or more experience differed significantly from the

TABLE XII

ANALYSES OF DIFFERENCES BETWEEN THREE LEVELS OF TEACHING EXPERIENCE AND NINE SELECTED VARIABLES

Comparisons	Mean	Standard Deviation	t-value	Probability
Variable: Total teaching experience				
1-5 years	3.0	1.27	9.7874	P<.01
6-15 years	10.1	3.05		
1-5 years	3.0	1.27	26.9830	P<.01
16 years or more	24.5	6.64		
6-15 years	10.1	3.05	17.9094	P<.01
16 years or more	24.5	6.64		
Variable: Workshops or in-service meetings attended				
1-5 years	3.3	2.85	0.0027	n.s.
6-15 years	3.3	2.31		
1-5 years	3.3	2.85	2.0421	P<.01
16 years or more	4.5	3.62		
6-15 years	3.3	2.31	2.0237	P<.05
16 years or more	4.5	3.62		
Variable: Number of professional magazines read				
1-5 years	2.7	1.24	1.3834	n.s.
6-15 years	3.1	1.45		
1-5 years	2.7	1.24	3.2022	P<.05
16 years or more	3.7	2.03		
6-15 years	3.1	1.45	1.9239	n.s.
16 years or more	3.7	2.03		

TABLE XII (Continued)

ANALYSES OF DIFFERENCES BETWEEN THREE LEVELS OF TEACHING EXPERIENCE AND NINE SELECTED VARIABLES

Comparisons	Mean	Standard Deviation	t-value	Probability
Variable: College nutrition courses completed				
1-5 years	1.7	0.89	1.3955	n.s.
6-15 years	1.9	0.82		
1-5 years	1.7	0.89	3.2005	P<.05
16 years or more	2.2	0.93		
6-15 years	1.9	0.82	1.9134	n.s.
16 years or more	2.2	0.93		
Variable: College foods courses completed				
1-5 years	2.3	0.80	1.7643	n.s.
6-15 years	2.5	0.67		
1-5 years	2.3	0.80	3.6159	P<.05
16 years or more	2.8	0.72		
6-15 years	2.5	0.67	1.9930	n.s.
16 years or more	2.8	0.72		
Variable: Use of real life experiences for teaching				
1-5 years	2.8	1.45	0.4196	n.s.
6-15 years	2.9	1.39		
1-5 years	2.8	1.45	4.2201	P<.05
16 years or more	4.0	1.33		
6-15 years	2.9	1.39	3.7997	P<.05
16 years or more	4.0	1.33		

TABLE XII (Continued)

ANALYSES OF DIFFERENCES BETWEEN THREE LEVELS OF TEACHING EXPERIENCE AND NINE SELECTED VARIABLES

Comparisons	Mean	Standard Deviation	t-value	Probability
Variable: Use of simulations of reality for teaching				
1-5 years	4.0	1.40	0.3741	n.s.
6-15 years	4.1	1.29		
1-5 years	4.0	1.40	4.2201	P<.05
16 years or more	4.9	1.01		
6-15 years	4.1	1.29	2.9905	P<.05
16 years or more	4.9	1.01		
Variable: Use of abstractions from reality for teaching				
1-5 years	4.0	1.05	2.5058	P<.05
6-15 years	4.4	0.93		
1-5 years	4.0	1.05	2.7771	P<.05
16 years or more	4.5	0.86		
6-15 years	4.4	0.93	0.4963	n.s.
16 years or more	4.5	0.86		
Variable: Use of individualized instruction for teaching				
1-5 years	3.3	1.61	0.6786	n.s.
6-15 years	3.5	1.71		
1-5 years	3.3	1.61	1.5986	P<.05
16 years or more	4.9	1.60		
6-15 years	3.5	1.71	4.1106	P<.05
16 years or more	4.9	1.60		

TABLE XII (Continued)

ANALYSES OF DIFFERENCES BETWEEN THREE LEVELS OF TEACHING EXPERIENCE AND NINE SELECTED VARIABLES

Comparisons	Mean	Standard Deviation	t-value	Probability
Variable: Total use of teaching techniques				
1-5 years	14.1	4.51	1.0726	n.s.
6-15 years	14.9	3.92		
1-5 years	14.1	4.51	5.2379	P<.05
16 years or more	18.4	3.31		
6-15 years	14.9	3.92	4.2201	P<.05
16 years or more	18.4	3.31		

other two groups. The level of significance was at the 0.05 level. Means revealed an increase in reading of professional magazines as years of teaching experience increased. The three levels of experience had means of 2.7, 3.1, and 3.7 for the number of professional magazines read.

College Nutrition Courses Completed

Six of the nine variables were significantly related to the number of college nutrition courses completed. The number of college nutrition courses completed were related at the 0.05 level of probability to teaching experience, foods courses completed, use of real life experiences, use of individualized instruction and the total use of teaching techniques. The relationship between the completion of college nutrition courses did not significantly influence attendance at workshops or in-service meetings, the use of teaching techniques based on simulations of reality, or the use of teaching techniques based on abstractions from reality.

Analysis of variance revealed a significant difference between the number of years taught and the number of college nutrition courses completed. There was a difference in means between teachers with varying teaching experience. Teachers with 1 to 5 years experience did not differ

significantly from those with 6 to 15 years experience; the difference in means was at the 0.05 level when teachers with 1 to 5 years experience were compared with those who had taught 16 years or more. The difference in means was nonsignificant when teachers with 6 to 15 years experience were compared with those having 16 years or more experience (Table XII).

College Foods Courses Completed

The number of college foods courses completed were significantly related to six of the nine variables at the 0.05 level of significance (Table X). Completion of foods courses did not statistically influence workshop or in-service meeting attendance or the use of teaching techniques classified as simulations of reality or abstractions from reality. Having taken foods courses did influence the use of real life experiences and individualized instruction as teaching techniques. The total number of techniques was also affected. These were significant at the 0.05 level.

Analysis of variance (Table XI), comparing the total years teaching experience with foods courses completed, revealed a difference at the 0.01 level of significance. Teachers with 1 to 5 years experience did not differ significantly from those with 6 to 15 years experience when

the number of college foods courses were compared (Table XII). Means for the college foods courses taken by these two groups were 2.3 and 2.5, respectively. The mean difference was also nonsignificant when teachers with 6 to 15 years experience were compared with teachers with 16 or more years experience. There was a significant difference between teachers having 1 to 5 years experience and those having 16 years or more. Means of 2.3 and 2.8 for the number of courses taken differed at the 0.05 level.

Use of Real Life Experiences as Teaching Techniques

All nine variables influenced the use of real life experiences as teaching techniques (Table X). The use of real life experiences also affected the use of teaching techniques classified as simulations of reality, abstractions from reality, individualized instruction, and the total use of teaching techniques.

Analysis of variance associating teaching experiences with the use of real life experiences as teaching techniques revealed a highly significant probability of relationship ($P<.01$). The analysis is presented in Table XI. Comparison of years teaching experience with the use of teaching techniques revealed a nonsignificant difference

between those with 1 to 5 years experience and those with 6 to 15 years experience (Table XII). Means for the number of real life experience techniques used were 2.8 and 2.9, respectively. Both of the groups with less experience differed significantly from the group with 16 years or more experience. The mean of 4.0 for use of techniques classified as real life experiences differed from means of 2.8 and 2.9 at the 0.05 level of significance.

Use of Simulations of Reality for Teaching Techniques

The use of simulations of reality as a basis for teaching techniques was statistically related to five of the nine variables. The relationship between the use of simulations of reality was nonsignificantly related to attendance at workshops or in-service meetings, reading of professional magazines, and the number of college courses completed in nutrition and in foods. Table X provides statistical data to show the relationship, at the 0.05 level of significance, between the use of simulations of reality, the use of abstractions from reality and the use of individualized instruction. The total use of teaching techniques was also significant at the 0.05 level.

Analysis of variance revealed a highly significant mean difference between years of teaching experience and the use of teaching techniques classified as simulations of reality. Data are included in Table XI.

Comparison of three groupings of teaching experience revealed a significant difference between years of teaching and the use of simulations of reality (Table XII). Teachers with 1 to 5 years experience did not differ significantly from the group with 6 to 15 years experience, but the mean use of simulations of reality for teachers with 16 years or more experience differed significantly from the other groups. Teachers with 1 to 5 years experience, 6 to 15 years experience and 16 years or more had means for techniques used of 4.0, 4.1, and 4.9, respectively.

Use of Abstractions from Reality for Teaching Techniques

The use of abstractions from reality was significantly related to four variables. All relationships involved teaching techniques. Abstractions from reality were related to the use of individualized instruction and the total use of teaching techniques (Table X).

Analysis of variance revealed a significant relationship between teaching experience and the use of abstractions from reality. These data are presented in Table XI.

Total teaching experience did not influence the use of abstractions from reality as a teaching technique. This was one of two variables not affected by teaching experience (Table XII). Teachers did differ when groups of teaching experience were compared. Teachers with 1 to 5 years experience were compared. Teachers with 1 to 5 years experience differed from the other two groups in having more experience. Teachers with 1 to 5 years experience had a mean use of 4.0 teaching techniques classified as abstractions from reality. Teachers with 6 to 15 years experience and 16 years or more had mean use of 4.4 and 4.5, respectively. Results indicated that teachers who have recently started teaching were using fewer techniques classified as abstractions from reality.

Individualized Instruction

The use of individualized instruction was significantly affected by eight of the nine variables. Analysis of variance revealed a highly probable relationship between teh use of individualized instruction and the total years teaching experience. These data are presented in Table XI.

As teaching experience increased, the use of individualized instruction increased. Teachers with 1 to 5 years experience had a mean use of 3.3 techniques; teachers with 6 to 15 years had a mean use of 3.5 techniques; teachers with 16 years or more experience had a mean use of 3.9 techniques classified as examples of individualized instruction. Comparison of means revealed a nonsignificant difference between teachers with 1 to 5 years and those with 6 to 15 years experience. There was a significant difference at the 0.05 level when teachers with 1 to 5 years experience were compared with teachers with 6 to 15 years experience and when teachers with 1 to 5 years experience were compared with teachers who had taught 16 years or more (Table XII).

Total Use of Teaching Techniques

The total use of teaching techniques was significantly related, at the 0.05 level, to eight of the nine variables. Workshop or in-service meeting attendance did not significantly influence the total use of teaching techniques (Table X).

Analysis of variance indicated a statistically significant difference between teaching experience and the total

use of teaching techniques. The difference was at the 0.05 level of significance (Table XI).

Teachers had a mean use of 15.5 techniques from the list of 24 techniques. Teachers with 1 to 5 years experience had the lowest mean for total techniques used. Teachers with 16 years or more experience had the highest mean. Means for the three groups were 14.1, 14.9, and 18.4, respectively. The difference between means for teachers with 1 to 5 years experience and 6 to 15 years experience was nonsignificant. There was a significant difference between the use of teaching techniques by teachers with 16 years or mroe experience and the other two groups. As teaching experience increased, the total number of teaching techniques used increased (Table XII).

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The general objective of this study was to present and evaluate some innovative techniques of teaching nutrition and survey instructional practices of a group of randomly selected secondary school home economics teachers. The specific purposes were to determine: [whether or not teachers of secondary school nutrition were employing a variety of teaching techniques which stress behavioral changes related to food selection; which teaching techniques and devices were demonstrated to be the most effective toward achieving behavioral change; the effectiveness of real life experiences, simulation of reality, abstractions from reality and individualized instruction for teaching and learning].

Data were obtained from 160 secondary school home economics teachers employed in 15 states within the United States during the 1971-1972 school year. The states were selected to represent varying geographic locations. Names of teachers to receive the questionnaire were selected from requested lists obtained from city and state supervisors of home economics. Three hundred questionnaires were mailed.

The instrument for the study was a questionnaire based on suggestions contained in a booklet by Spitze, Choosing Techniques for Teaching and Learning. Four classifications of teaching techniques were used as presented in the publication, but six specific techniques were chosen from a larger number to represent each of the four classifications. Techniques chosen for the study were related to teaching nutrition education.

The instrument for the study, "Techniques of Teaching Nutrition Education," was composed of three parts. Ten questions were related to the teacher and her situation. The second part concerned information regarding the use of audio-visual teaching devices. The third portion of the instrument sought information concerning the use and effectiveness of teaching techniques selected to achieve behavioral change. A total of 24 teaching techniques were listed. Data were analyzed to determine the use and effectiveness of the techniques listed and to determine whether differences existed between teachers with different educational backgrounds. Correlations were statistically determined between five factors concerning the use of teaching techniques.

For purposes of analysis, teaching experience was grouped according to the number of years taught. The first

group included teachers with 1 to 5 years experience; the second included those with 6 to 15 years experience, the third included those with 16 years or more experience.

The educational background of the respondents revealed that 61 teachers had taught from 1 to 5 years; 58 had taught from 6 to 15 years; 41 had taught 16 years or more. An initial grouping of teaching experience revealed that six teachers had taught 30 to 39 years and two had taught 40 years or more.

The second question asked for "the number of years you have taught nutrition." The difference between the total teaching experience and years experience teaching nutrition was not sufficient to justify separate analysis of data. Teachers with more than 15 years experience composed the group who had taught outside the field of homemaking.

Information concerning academic training revealed that as teaching experience increased, academic training increased. Ninety-five of the sample held Bachelor's degrees; 34 held a Master's degree; 30 had completed work beyond the Master's degree; two did not respond. The majority of teachers with only Bachelor's degrees had taught from 1 to 5 years. The percentage of teachers holding Master's degrees revealed that 13.1 per cent who had taught 1 to 5 years had a Master's

degree or had completed work beyond the Master's degree; 41.4 per cent of the teachers with 6 to 15 years experience held a Master's degree or had completed work beyond the degree; 78.0 per cent of the teachers with 16 years or more experience had Master's degrees or had completed work beyond the degree.

Teachers were requested to report the number of professional workshops or in-service meetings attended within the past year. Responses indicated that 49 teachers had attended city-directed meetings; 59 teachers had attended area-directed meetings; 102 teachers had attended state-directed meetings; 46 teachers had attended college-directed meetings; and 72 teachers had attended workshops or in-service meetings sponsored by a professional organization.

Statistical analysis revealed a nonsignificant relationship between workshop or in-service meeting attendance and educational background data. There was a significant relationship between workshop or in-service meetings attended and the use of teaching techniques based on real life experiences. The relationship with other classifications of teaching techniques was nonsignificant. Analysis of variance associating teaching experience with attendance at workshops or in-service meetings was significant at the 0.05

level. Teachers who had taught 16 years or more did attend more meetings than teachers with less experience. Means for workshop or in-service attendance were 3.3, 3.3, and 4.5 for the three levels of teaching experience.

Five professional magazines were listed and teachers were asked to check those they read and to add others not on the list. Data indicated that Forecast for Home Economics was read by all except one respondent. What's New in Home Economics was inadvertently omitted from the list; however, 68 teachers or 42.5 per cent added this magazine to the list. The Journal of Home Economics was read by 70.8 per cent of the respondents. Data indicated that teachers with 16 years or more experience read more magazines than teachers with less experience. Means for the number of magazines read were 3.3, 3.3, and 4.5 for the three levels of teaching experience.

The questionnaire requested information concerning the "grade level you teach." Responses indicated that the question may not have been interpreted correctly since some teachers checked all seven grade levels. Based on responses, 76 classes were composed of students in grades six, seven and eight. A total of 448 classes were composed of grades nine, ten, 11 and 12. The highest percentage of classes was composed of students in grades 11 and 12.

Teachers were asked three questions related to nutrition and the students they were teaching. One hundred and fifty teachers responded affirmatively to the question "Do you think the majority of your students need to improve their eating habits?" Only seven teachers responded negatively; two teachers checked "do not know."

One hundred and eleven teachers answered affirmatively to the question "Have you done any research in regard to the dietary patterns of the students you teach?" A small percentage answered the second part of the question asking about the kind of research conducted; those who did answer said they had collected and utilized dietary records of their students. A few teachers indicated an interest in plate waste in the school lunchroom. Forty-seven teachers had not conducted any research; three teachers did not respond to the question.

One hundred and three teachers, 64 per cent, answered that the students they taught were stimulated during the study of nutrition. Answers to this question were not consistent with the effectiveness ratings given to teaching techniques since only six of the teaching techniques rated as "very effective" were considered to be "very effective" by more than 50 per cent of the respondents. Forty-one

teachers, 25.5 per cent, responded negatively to the question.

The mean for the number of nutrition courses taken was 1.9. Ninety-eight per cent of the teachers had taken a course of basic nutrition; 57.1 per cent had completed an advanced nutrition course; less than 10.0 per cent of the respondents had studied courses related to diet therapy or bionutrition.

The number of college nutrition courses completed was significantly related to total teaching experience, number of professional magazines read, number of college foods courses completed and the use of teaching techniques based on real life experiences and individualized instruction. The number of nutrition courses completed did not significantly influence attendance at workshops or in-service meetings or the use of teaching techniques based on simulations of reality or abstractions from reality.

Analysis of variance comparing the total years teaching experience with the number of nutrition courses completed was significant at the 0.01 level. Means for the number of courses completed were 1.7, 1.9, and 2.2 for the three levels of teaching experience.

The mean for the number of college foods courses completed was 2.5. Attendance at workshops or in-service meetings was not significantly related to the number of foods courses taken, but there was a significant relationship with other factors involving educational background. The relationship with the use of simulations of reality and abstractions from reality was also nonsignificant.

Analysis of variance indicated a significance at the 0.01 level when the number of foods courses completed was compared with total teaching experience. Means for the number of courses completed were 2.3, 2.5, and 2.8 for the three levels of teaching experience.

Eight audio-visual teaching devices were listed and teachers were asked to indicate frequency of use during the teaching of a nutrition unit. Filmstrips and over-head transparencies were the two most-used devices; television and programmed instruction were the least-used devices. The percentage of responses for "never use" was higher than the percentage of responses for "not available."

The mean use of the six teaching techniques classified as real life experiences was 3.2. Family membership and personal health and appearance were the two most-used techniques of the six examples of real life experiences. Citizen

participation was the least used technique of this group; however, this technique was rated "very effective" by 71.4 per cent of those who had used citizen participation for teaching and learning. Family membership received the lowest rating for effectiveness; only 25.5 per cent of the teachers rated the technique as "very effective." None of the six techniques classified as real life experiences was rated "ineffective" by more than 10 per cent of the teachers.

The use of real life experiences was significantly affected by all of the nine variables. Educational background of the teachers and the use of other classifications of teaching techniques influenced the use of real life experiences.

Analysis of variance revealed a highly significant relationship between total teaching experience and the use of real life experiences for teaching and learning. Levels of teaching experience affected the use of real life experiences. A comparison of means indicated that teachers with 16 years or more teaching experience used more teaching techniques classified as real life experiences than those teachers with less experience. Means for the three levels of experience were 2.8, 2.9, and 4.0.

The mean use of the six teaching techniques classified as simulations of reality was 4.29. Based on responses, this group of techniques was used more extensively than the other three classifications of techniques. Two of the six techniques, demonstrations and discussion, were used by 143 teachers, 89.4 per cent, of the sample group. Games had been used by 133 teachers, 83.1 per cent, of the sample group. The least used technique classified as a simulation of reality was laboratory and experimentation; however, this technique was ranked fifth in the list of the most effective teaching techniques.

Simulations of reality were used by a high percentage of the teachers and were rated high for effectiveness. Three of the six techniques were rated "very effective" by more than 50 per cent of the teachers. One of these, laboratory and experimentation, was rated "very effective" by 57.1 per cent of those who used this technique. Games and demonstrations were rated "very effective" by 51.9 per cent and 60.1 per cent of the teachers, respectively. Discussion was used by 89.4 per cent of the teachers; however, only 30.0 per cent rated the technique "very effective."

The use of simulations of reality was not influenced by the educational background factors investigated. There

was a significant relationship between the use of simulations of reality and the other three classifications of teaching techniques.

Analysis of variance revealed a highly significant relationship between total teaching experience and the use of simulations of reality. Teachers with 16 years or more experience used more teaching techniques classified as simulations of reality than teachers with less experience. Means of 4.0, 4.1, and 4.9 represented the use of the six techniques by the three levels of teaching experience.

Abstractions from reality were used by a high percentage of the respondents but were rated low for effectiveness. Four techniques from this group, recitation, examinations, lecture and supervised study, were the four most used techniques of the 24 investigated. Unfortunately, teachers who used these techniques rated them one, three, five and six in the list of most ineffective techniques. Lecture, recitation and examinations were rated "very effective" by less than 20 per cent of the teachers who used them. Supervised study was rated "very effective" by 26.7 per cent of the teachers. Two of the techniques, programmed instruction and learning packages, had been used by only one-fourth of the respondents. Approximately one-fourth of the teachers who had used these two techniques rated them "very effective."

The use of abstractions from reality was not significantly related to the educational background of the teachers, but was related to the use of the other three classifications of teaching techniques. Teachers with 1 to 5 years experience used fewer techniques classified as abstractions from reality than did teachers with more experience. The mean use of teaching techniques based on abstractions from reality was 4.0, 4.4, and 4.5 for the three levels of teaching experience. Since teachers who used these techniques did not believe them to be effective for teaching and learning, the lower mean for teachers entering the profession may be a favorable trend.

The six examples of teaching techniques classified as individualized instruction had a mean use of 3.81. One of the techniques was rated as the most effective teaching technique of the 24 listed. The technique referred to, student preparation of nutritious snack foods, was rated "very effective" by 61.5 per cent of the 122 teachers who had used this technique. Only two teachers reported this technique to be "ineffective." The educational background of teachers was related to the use of individualized instruction as a teaching technique. The comparison between attendance at workshops or in-service mettings and the use of individualized instruction was nonsignificant. The use of

individualized instruction was also related to the use of the other three classifications of teaching techniques.

Analysis of variance indicated a highly significant relationship between teaching experience and the use of individualized instruction. Means indicated that the use of individualized instruction increased as teaching experience increased. The means for the use of the six techniques were 3.3, 3.5, and 3.9 for the three teaching levels.

Analysis of the four classifications of teaching techniques revealed a mean use of 15.5 techniques. Twenty-four teaching techniques were listed. Teachers who had taught five years or less had a mean use of 14.1 techniques; teachers who had 6 to 15 years experience had a mean use of 14.9 techniques; teachers with 16 years or more experience had a mean use of 18.4 techniques. The highest percentage of teachers reported using simulations of reality for teaching and learning. The effectiveness rating was also higher for this group of techniques than for the other three groups. Responses indicated that teachers used abstractions from reality almost as often as they used simulations of reality, but the percentage of teachers who considered abstractions from reality to be "very effective" was much lower. Simulations from reality were rated "very effective" by 47.4 per

cent of teachers using the techniques; abstractions from reality were rated "very effective" by only 20.6 per cent of the respondents who used them. Individualized instruction was rated "very effective" by 45.3 per cent of the teachers; "fairly effective" by 46.8 per cent; "ineffective" by 7.8 per cent. Real life experiences were rated "very effective" by 39.8 per cent of the instructors, and "ineffective" by less than 1.0 per cent of the instructors.

Means indicated that increased teaching experience was an indication of increased academic preparation and background and also an indication of increased use of teaching techniques. Data revealed that teachers were using some techniques which they rated as "ineffective." The lowest ratings were assigned to the group of teaching techniques classified as abstractions from reality. Based on responses of teachers who used the techniques, the most effective techniques were observations and field trips, citizen participation, student preparation of nutritious snacks, demonstrations and laboratory and experimentation. The most ineffective techniques were reported to be recitation, programmed instruction, lecture, group reports and examinations.

The author is of the opinion that more articles concerning nutrition should be published in magazines which are most likely to be read by secondary school teachers of

home economics. Data from this study indicate that Forecast for Home Economics, Journal of Home Economics, and What's New in Home Economics are the most widely read magazines by this academic level of teachers.

Responses to the use of teaching devices appear to indicate a need for instruction to assist teachers to plan, prepare and use more audio-visual devices. Workshops or in-service meetings or college courses could provide needed assistance and instruction.

Since teaching techniques which stress learner involvement are believed to be the most effective methods to change behavior, additional research is needed to develop learning experiences related to nutrition. Greater emphasis should be placed on the study of nutrition in the home economics curriculum.

B I B L I O G R A P H Y

1. Ack, Marvin. "Is Education Relevant?" Journal of Home Economics, 62:647, November, 1970.

2. Adelson, Sadye F. "Changes in Diets of Households, 1955-1965." Journal of Home Economics, 60:48, June, 1968.

3. Aldrich, Robert A. "Nutrition and Human Development." Journal of the American Dietetic Association, 46:453, June, 1965.

4. Alford, Betty B. "Selected Nutrients in Bone Growth and Development," Porceedings of Seventeenth Southern Regional Conference, College and University Teachers of Food and Nutrition, Western Section, Dallas, Texas, December 1-2, 1971.

5. Allen, Donald E., Zella J. Patterson, and Glenda L. Warren. "Nutrition, Family Commensality, and Academic Performance." Journal of Home Economics, 62:333, May, 1970.

6. Babcock, Charlotte G. "Attitudes and the Use of Food." Journal of the American Dietetic Association, 38:546, June, 1961.

7. Balsley, Marie, M. F. Brink, and Elwood W. Speckman. "Nutritional Components in Some Problems of Adolescence." Journal of Home Economics, 60:648, October, 1968.

8. Bell, Camille G. "Can the Art of Teaching be Structured?" Journal of Home Economics, 62:34, January, 1970.

9. Bensinger, Gail. "Mystery Deepens With Conveniences." The Dallas Morning News, Section E, p. 2, April 27, 1972.

10. Blackburn, Mary L. "Who Turns the Child "Off" to Nutrition?" Journal of Nutrition Education, 2:45, Fall, 1970.

11. Bogniard, Jane N. and Julia I. Dalrymple. "The Use of Simulation Techniques." Journal of Home Economics, 62:729, December, 1970.

12. Bricker, Alice June. "Some Environmental Influences on Food Habits of Women Clerical Workers." Unpublished Doctoral dissertation, New York University, 1961.

13. Brown, Esther L. "College Students Look at the Basis for Their Food Habits." Journal of Home Economics, 59:784, December, 1967.

14. Bruch, Hilda. "Psychosomatic Aspects of Malnutrition During Adolescence." Postgraduate Medicine, 47:98, May, 1970.

15. Burgess, Anne. "Malnutrition and Food Habits." American Journal of Clinical Nutrition, 9:132, January-February, 1961.

16. Byrd, Flossie M. "A Definition of Home Economics for the 70's." Journal of Home Economics, 62:411, June, 1970.

17. Chatfield, Elizabeth. "Big Ideas in Teaching Nutrition." Proceedings of Seventeenth Southern Regional Conference, College and University Teachers of Food and Nutrition, Western Section, Dallas, Texas, December 1-2, 1971.

18. "Co-ed Correspondents Sound Off on Home Economics." Forecast for Home Economics, 15:F-34, October, 1969.

19. Cupp, Leanne E. "Diets, Donuts and Dances--the Teenage Years," National Nutrition Education Conference, Mayflower Hotel, Washington, D. C., November 2-4, 1971.

20. Dickins, Dorothy. "Factors Related to Food Preferences." Journal of Home Economics, 57:427, June, 1965.

21. Dickins, Dorothy. "Food Purchases and Use Practices of Families of Gainfully Employed Homemakers." Mississippi Agriculture Experiment Station Bulletin 620, May, 1961.

22. Dickins, Dorothy and A. A. Fanelli. "Practices and Preferences in Consumption of Sweet Milk and "Competing" Beverages." Journal of Home Economics, 48:114, 1956.

23. Dickins, D. and V. Ferguson. "Knowledge of Nutrition as Related to the Use of Dairy Products." Journal of Home Economics, 50:25, 1958.

24. Dowell, L. J. "A Study of Selected Health Education Implications." Research Quarterly, 37:387, 1966.

25. Dwyer, Johanna T., Jacob J. Feldman and Jean Mayer. "Nutritional Literacy of High School Students." Journal of Nutrition Education, 2:59, Fall, 1970.

26. Emmer, Edmund T. "Transfer of Instructional Behavior and Performance Acquired in Simulated Teaching." The Journal of Educational Research, 65:178, December, 1971.

27. English, Sandal and Pritch. "Exciting Flavor in Seeds, Grains." The Dallas Morning News, Section E, p. 2, April 27, 1972.

28. Eppright, Ercel. "How Can We Become a Literate and Responsible Nation in Nutrition?" Iowa Governor's Conference on Food, Nutrition and Health, Iowa State University, Ames, Iowa, March, 1970. Journal of Nutrition Education, 2:113, Winter, 1970.

29. Eppright, E. S. and P. P. Swanson. "Distribution of Nutrients Among Meals and Snacks of Iowa School Children." Journal of the American Dietetic Association, 31:256, March, 1955.

30. Eppwright, Margaret. "Adolescent Nutrition." Today's Health, 36:42, May, 1958.

31. Erhard, Darla. "Nutrition for the "Now" Generation." Journal of Nutrition Education, 2:35, Spring, 1971.

32. Everson, Gladys J. "Bases for Concern About Teenagers' Diet." Journal of the American Dietetic Association, 36:17, January, 1960.

33. Finley, Bernice. "Creative Techniques Involve Students." Forecast for Home Economics, 17:F-152, September, 1971.

34. "Food and Nutrient Intake of Individuals in the United States, Spring, 1965, Household Food Consumption Survey, 1965-1966," United States Department of Agriculture, Washington, D. C., January, 1972.

35. Forness, Steven R. "Behavioristic Approach to Classroom Management and Motivation." Psychology in the Schools, 7:356, October, 1970

36. Gagne, Robert M. "Behavioral Objectives? Yes!" Educational Leadership, 29:20, February, 1972.

37. "Gallup Analyzes Customer Spending Habits." Food Service, 30:8, 1968.

38. Gassie, Edward W. and J. H. Jones, Jr. "Sustained Behavioral Change." Journal of Nutrition Education, 4:19, Winter, 1972.

39. Gibbons, Maurice. "Changing Secondary Education Now." The Independent School Bulletin, 30:25, May, 1971.

40. Goldsmith, Grace A. "Clinical Nutritional Problems in the United States Today." Nutrition Reviews, 23:1, January, 1965.

41. Hammer, S. L. "The Obese Adolescent." Journal of School Health, 35:246, 1965.

42. Hampton, Mary C., Ruth L. Huenemann, Leona R. Shapiro, and Barbara W. Mitchell. "Caloric and Nutrient Intakes of Teen-agers." Journal of the American Dietetic Association, 50:385, May, 1967.

43. Harker, Charlotte and Penelope E. Kupsinel. "Nutrition Education for Today." Journal of Home Economics, 63:15, January, 1971.

44. Harper, A. E. "Nutrition, Where Are We? Where Are We Going?" American Journal of Clinical Nutrition, 22:87, January, 1969.

45. Heald, F. P. "Natural History and Physiological Basis of Adolescent Obesity." Federal Proceedings, United States Department of Agriculture, Washington, D. C., 1966.

46. Hendel, Grace M., Marguerite C. Burk, and Lois A. Lund. "Socioeconomic Factors Influence Children's Diets." Journal of Home Economics, 57:205, March, 1965.

47. Hill, Mary M. "Creating Good Food Habits--Start Young, Never Quit." Food for Us All, 1969 Yearbook of Agriculture, United States Department of Agriculture, United States Printing Office, 1969.

48. Hinton, Maxine Armstrong, Ercel S. Eppright, Hester Chadderson, and Leroy Wolins. "Eating Behavior and Intake of Girls 12 to 14 Years Old." Journal of the American Dietetic Association, 43:223, September, 1963.

49. Huenemann, Ruth L. "A Review of Teenage Nutrition in the U.S." United States Department of Agriculture, Washington, D. C. (mimeographed, 1971)

50. Huenemann, Ruth L., Leona R. Shapiro, Mary C. Hampton, and Barbara W. Mitchell. "Food and Eating Practices of Teenagers." Journal of the American Dietetic Association, 53:17, July, 1968.

51. Jalso, Shirley B., Marjorie M. Burns, and Jerry M. Rivers. "Nutritional Beliefs and Practices." Journal of the American Dietetic Association, 47:263, October, 1965.

52. Jefferson, Sue and Anna Marie Erdman. "Taste Sensitivity and Food Aversons of Teenagers." Journal of Home Economics, 62:605, October, 1970.

53. Johnson, Ogden. "Nutrition Education--What is the Goal?" Nutrition Reviews, 23:353, December, 1965.

54. Kapfer, Philip. "An Instructional Management Strategy for Individualized Learning." Phi Delta Kappa, 49:260, January, 1968.

55. Kintzer, Frederick C. "Approaches to Teaching Adults." Journal of the American Dietetic Association, 50:475, June, 1967.

56. Leverton, Ruth. "The Paradox of Teenage Nutrition." Journal of the American Dietetic Association, 53:13, July, 1968.

57. Litman, J. Theodore, James P. Cooney, Jr., and Ruth Stief. "The Views of Minnesota School Children on Food." Journal of the American Dietetic Association, 45:433, November, 1964.

58. Livingston, Sally K. "What Influences Malnutrition?" Journal of Nutrition Education, 2:18, Summer, 1971.

59. Lowenberg, Mirian E., Niege Todhunter, Eva D. Wilson, Moira C. Feeny and June R. Savage. Food and Man. New York: John Wiley and Sons, 1968.

60. MacReynolds, Joan Parker. "Can Teaching Good Nutrition Be Bad?" Journal of Nutrition Education, 2:13, Summer, 1970.

61. McFarland, James. "Industry's Responsibility for Developing Dietary Habits." National Nutrition Education Conference, Mayflower Hotel, Washington, D. C., November 2-4, 1971.

62. McGanity, William J. "Nutrition Survey in Texas." Texas Medicine, 65:40, March, 1969.

63. Mager, Robert. Developing An Attitude Toward Learning. Palo Alto, California: Fearon Publishers, 1968.

64. Manno, Anne. "Intelligent Snacking." Forecast for Home Economics, 17:91, September, 1971.

65. Markham, Margaret. "Developmental Nutrition and the Facts of Life." Foods and Nutrition, p. 32, January, 1972.

66. Marqusee, Richard H. "Bioenergetics: An Ecological Approach to Nutrition Education." Journal of Nutrition Education, 2:47, Spring, 1971.

67. Maternal Nutrition and the Course of Pregnancy. Committee on Maternal Nutrition, Food and Nutrition Board, National Research Council, National Academy of Sciences, Washington, D. C., 1970.

68. Metheny, Norma Y., Fern E. Hunt, Mary Brown Patton, and Helen Heye. "The Diets of Preschool Children: Nutritional Sufficiency Findings and Family Marketing Practices." Journal of Home Economics, April, 1972.

69. Mitzell, Harold. "The Impending Instruction Revolution." Phi Delta Kappan, 51:434, April, 1970.

70. Moore, H. B. "Psychological Facts and Dietary Fancies." Journal of the American Dietetic Association, 28:789, 1952.

71. Morrison, Edward. "The Use of Behavioral Objectives in Instructional Materials." American Vocational Journal, 45:46, February, 1970.

72. Morse, Ellen, Mary M. Clayton, and Lola de G. Cosgrove. "Mother's Nutrition Knowledge." Journal of Home Economics, 59:667, October, 1967.

73. Niemeyer, Katherine. "Nutrition Education in Behavioral Change." Journal of Nutrition Education, 3:32, Summer, 1971.

74. Orr, O. P. "An Evaluation of Health Interests and Health Needs as Basic Premises in Selecting Health Content in Secondary Schools of Knoxville, Tennessee." Dissertation Abstract, 26:8A, 1966.

75. Parrish, John. "Implications of Changing Food Habits for Nutrition Educators." Journal of Nutrition Education, 2:140, Spring, 1971.

76. Pilgrim, Francis J. "What Foods Do People Accept or Reject?" Journal of the American Dietetic Association, 38:439, June, 1961.

77. Pucinski, Roman C. "Vocational Education--A Hope For the Future." Illinois Teacher of Home Economics, 11:99, 1967-1968.

78. Rechicige, Miloslav. "Nutrition and Health--A National Challenge." Journal of Applied Nutrition, 22:9 Spring-Summer, 1970.

79. Ringis, Herbert. "Foreword: A 'Frame of Reference' for Change." Journal of Secondary Education, 46:197, May, 1971.

80. Ritchie, Jean. "Teaching People Better Habits of Diet." Journal of the American Dietetic Association, 26:94, February, 1950.

81. Robinson, Corinne. Normal and Therapeutic Nutrition. New York: Macmillan Company, 1969.

82. Rosenstock, Irwin M. "Psychological Forces, Motivation, and Nutrition Education." American Journal of Public Health, 59:1192, November, 1969.

83. Roundtree, J. "The Human Factor in Nutrition Study." Journal of Home Economics, 41:433, 1949.

84. Sargent, Bettye. "I Hear, and I Forget." The Independent School Bulletin, 30:60, December, 1970.

85. Schaefer, Arnold E. and Ogden C. Johnson. "Are We Well Fed? The Search for the Answer." Nutrition Today, 46:2, Spring, 1969.

86. School Health Education Study, Devising Health Education, Washington, D. C., 1964.

87. Shipman, Jean. "Self Study Laboratory Updates Teaching Materials." What's New in Home Economics, 35:50, May-June, 1971.

88. Simmons, S. Bart. "Successful Innovation Through Effective Educational Leadership." Journal of Secondary Education, 46:117, March, 1970.

89. Sinacore, John S. "The Place of Nutrition in the Health Education Curriculum." American Journal of Public Health, 61:2282, November, 1971.

90. Sipple, Horace L. "Problems and Progress in Nutrition Education." Journal of the American Dietetic Association, 59:18, July, 1971.

91. Sisler, Grovalynn. "Student Reaction to an Audio-tutorial System." Journal of Home Economics, 62: 40, January, 1970.

92. Smith, Wendell I., Elizabeth K. Powell, and Sherman Ross. "Food Aversions: Some Additional Personality Correlates." Journal of Consulting Psychology, 19:145, 1958.

93. Spindler, Evelyn. "Better Diets for Teenagers." Nursing Outlook, 12:31, February, 1964.

94. Spitze, Hazel Taylor. Choosing Techniques for Teaching and Learning, Home Economics Education Association. Washington, D. C.: National Education Association, 1970.

95. Stasch, Ann R., Mae Martha Johnson, and Glennel J. Spangler. "Food Practices and Preferences of Some College Students." Journal of the American Dietetic Association, 57:523, December, 1970.

96. Stiebling, Hazel K. "How Far Have We Come?" Journal of Home Economics, 59:341, May, 1967.

97. Stienberg, Sheldon. "Schools are Teaching Nutrition-but They're Teaching it the Wrong Way." Nation's Schools, 77:84, May, 1966.

98. Stitt, Kathleen R. "Nutritive Value of Diets Today and Fifty Years Ago." Nutrition Reviews, 21:257, September, 1963.

99. Tacionis, Francis and Ann S. Rice. "Put All Five Senses to Work." Reprint from What's New In Home Economics, 1969.

100. Taylor, Clara Mae and Overa Florence Pye. Foundation of Nutrition. New York: Macmillan and Company, 1966.

101. Ten-State Nutrition Survey in the United States, 1968-1970, Preliminary report to the Congress, United States Department of Health, Education, and Welfare, April, 1971.

102. The 1969 World Almanac and Book of Facts, ed. Loman H. Long, New York Newspaper Enterprise Association Incorporated, 1969.

103. Torres, R. M. "Dietary Patterns of Puerto Rican People." American Journal of Clinical Nutrition, 7:349, 1959.

104. Van de Mark, Mildred and Virginia Ruth Sherman Underwood. "Dietary Habits and Food Consumption Patterns." Journal of Home Economics, 63:540, October, 1971.

105. Vargas, Julie S. "Teaching as Changing Behavior." Journal of the American Dietetic Association, 58:512, March, 1971.

106. Wang, Virginia Li. "Food Information of Homemakers and 4-H Youth." Journal of the American Dietetic Association, 58:215, March, 1971.

107. Williams, Frank. "Assessing Pupil-Teacher Behavior Related to a Cognitive-Affective Teaching Model." Journal of Research and Development in Education, 4:14, Spring, 1971.

A P P E N D I C E S

APPENDIX A

Box 25575
T.W.U. Station
Denton, Texas
December 10, 1971

Recent articles concerning techniques of teaching nutrition have stimulated me to do some research concerning the relationships between techniques used and changed eating patterns.

Will you help me do a survey? I need a list of names and mailing addresses of 20 secondary school home economics teachers who will be willing to reply to a questionnaire. In order to survey teachers from a large number of states and geographic areas, I am particularly desirous of your cooperation. Could you possibly take the time to send the list this coming week? The questionnaire is based on suggestions made by Dr. Hazel Spitze in a recent Home Economics Education Association publication and concerns the teacher, her situation, and techniques of teaching she has found to be effective. It is easy to mark and does not ask for personal information.

Thank you for your cooperation. I will be glad to report the findings to you if you desire. The study will serve to fulfill requirements for a doctoral degree at Texas Woman's University. Your assistance will be greatly appreciated.

Sincerely yours,

Aleene King Van de Grift

APPENDIX B

Box 25575
T.W.U. Station
January 2, 1972

Dear Teacher of Home Economics:

Your state supervisor sent your name as one willing to assist with a study regarding the teaching of nutrition. Enclosed is a questionnaire concerning teaching techniques that you have found instrumental in improving student food patterns.

The data obtained from the questionnaire will be used as the basis for a doctoral dissertation at Texas Woman's University. The study concerns an appraisal of techniques and devices planned and used to achieve behavioral change.

Please complete the questionnaire and return it by January 15 or soon after. Your cooperation will be greatly appreciated, and your responses will make a contribution to nutrition education.

Sincerely yours,

Aleene King Van de Grift

APPENDIX C

Box 25575
T.W.U. Station
Denton, Texas
January 2, 1972

Dear Teacher of Home Economics:

Your city supervisor sent your name as one willing to assist with a study regarding the teaching of nutrition. Enclosed is a questionnaire concerning teaching techniques that you have found instrumental in improving student food patterns.

The data obtained from the questionnaire will be used as the basis for a doctoral dissertation at Texas Woman's University. The study concerns an appraisal of techniques and devices planned and used to achieve behavioral change.

Please complete the questionnaire and return it by January 15 or soon after. Your cooperation will be greatly appreciated, and your responses will make a contribution to nutrition education.

Sincerely yours,

Aleene King Van de Grift

APPENDIX D

TECHNIQUES OF TEACHING NUTRITION EDUCATION

Questionnaire

Data Sheet Concerning the Teacher and Her Situation

The following items call for important information concerning you and your teaching situation. Will you please check each statement carefully?

1. Total number of years teaching experience including 1971-1972: _____

2. Number of years you have taught foods and nutrition: ___

3. Academic training in home economics:

   Bachelor's degree _____ Hours beyond Masters _____
   Master's degree _____

4. Professional workshops or in-service meetings you have attended within the past year. (Please answer in numbers.)

   City directed _____ College directed _____
   Area directed _____ Professional organization _____
   State directed _____

5. Professional magazines that you read:

   Forecast for Home Economics _____
   Illinois Teacher for Contemporary Roles _____
   Journal of the American Dietetic Association _____
   Journal of Home Economics, AHEA _____
   Journal of Nutrition Education _____
   Others: _____

6. Grade level you teach:

   Sixth _____ Tenth _____
   Seventh _____ Eleventh _____
   Eighth _____ Twelfth _____
   Ninth _____

7. Do you think that the majority of your students need to improve their eating habits?

   Yes_____ No_____ Do not know_____

8. Have you done any research in regard to the dietary patterns of the students you teach?

   Yes_____ No_____
   What research did you do?_____

9. Do you feel that your students are stimulated during the study of nutrition?

   Yes_____ No_____ Do not know_____

10. Please check the college courses you have completed:

Nutrition		Foods	
Basic Nutrition	_____	Principles of Food	_____
Advanced Nutrition	_____	Preparation	
Diet Therapy	_____	Meal Management	_____
Bionutrition	_____	Experimental Foods	_____
Others:	_____	Others:	_____
	_____		_____

11. Do you have some helpful suggestions for those teachers who feel insecure or inadequate when teaching nutrition education?

_____

_____

_____

_____

_____

_____

_____

_____

Use of Teaching Aids

Please indicate how often you use the following devices when teaching nutrition education. A (✓) may be used.

Device	Daily	Weekly	At least once during unit	Do not use	Not available
12. Tape recorder					
13. Transparency projector					
14. Filmstrips					
15. Opaque projector					
16. Phonograph records					
17. Slides					
18. Television					
19. Programmed instruction					

Effectiveness of Teaching Techniques Used by Nutrition Teachers Seeking Behavioral Change

Four groups of teaching techniques are listed below. Please check ✓ the ones you have used and rate the effectiveness of the techniques used toward achieving the goal of improved food habits.

Effectiveness

3 = very effective
2 = fairly effective
1 = ineffective
0 = no evidence

Group I. Real-Life Experiences (student learns to do by doing)

Statement	Technique		Effectiveness			
	Have Used	Have Not Used	Rating of Use			
	1	2	3	2	1	0
20. Paid or volunteer work experiences (classroom activities are geared to meet student's needs for knowledge, skills, and activities related to work).						
21. Family membership (supervised home experiences).						
22. Personal health and appearance (student assesses need and is guided toward self improvement).						
23. Citizen participation (projects are selected for student participation, such as assistance at nurseries, teaching nutrition to lower grades, and the like).						
24. Observations and field trips (students observe real-life situations which serve to broaden awareness, such as observing economically deprived persons).						
25. Preparation for events (exhibit at county fair, preparation of display cases, appearance on television or radio, articles for school paper).						

*Please list other real-life experiences you have utilized:

Group II: Simulations of Reality for Teaching and Learning (pretense that is enough like reality to seem possible).

Statement	Technique		Effectiveness			
	Have Used	Have Not Used	Rating of Use			
	1	2	3	2	1	0
26. Role playing (students act out a given situation without rehearsal: could involve trying to guide an over-eater, a teenager with problem skin, a person with a multitude of food prejudices, and the like).						
27. Skits and pantomime (designed to dramatize a situation, written by teacher, students, or secured from another source. Some rehearsal needed).						
28. Games (nutrition crossword, nutrition dominoes, "Who Am I?" and the like).						
29. Demonstrations (given by students, teacher, or resource person to present ideas or processes or to provide opportunity to experience attitudes or feelings. Examples--choice of foods to meet daily food requirements, variation in caloric value of similar types of food, variation in nutritive value of similar foods).						

Statement	Technique		Effectiveness			
	Have Used	Have Not Used	Rating of Use			
	1	2	3	2	1	0
30. Laboratory and experimentation (animal experiments, student experiments to see if a change in diet achieves desired changes. Examples--reduced caloric intake for weight loss, increased intake of vitamin A for certain skin problems).						
31. Discussion (key questions are planned to guide discussion, goals are clear to all. May include whole group, panel, debate, case studies, provocative questions).						

*Please list other simulation techniques you have tried:

Group III: Abstractions from Reality (any reading, writing, or speaking that is not seen by the student as a part of his everyday life, or of a simulation of life in which he is interested).

32. Lecture (teacher, students, or resource person presents information or related personal experiences--visual aids may or may not be used).						
33. Recitation (question and answer session in which the teacher asks the questions, re-call type of questions are used).						

Statement	Technique		Effectiveness			
	Have Used	Have Not Used	Rating of Use			
	1	2	3	2	1	0
34. Programmed instruction, computer assisted instruction, or audio-tutorial instruction (self-instruction from a machine, book, computer, films or tapes--prepared for self-pacing and self-evaluation).						
35. Learning packages (consists of major concepts, behavioral objectives, suggested activities, and a means of evaluation. Are planned by the teacher, contain specific and detailed instruction for the student--prepared for self-teaching at a student's own rate).						
36. Supervised study (class time is used for study, usually assigned reading with a "study guide" or a set of questions to be answered. Teacher circulates to inspire, encourage, and offer reference materials and guidance).						
37. Examinations (used to obtain information with which to assign grades).						

*Please list other types of abstractions from reality you have used:

_____

Group IV: Individualized Instruction (students work individually or in small groups which change frequently according to individual interests, talents, and needs).

Statement	Technique		Effectiveness			
	Have Used	Have Not Used	Rating of Use			
	1	2	3	2	1	0
39. Total group planning together (Example: defining or describing a well-nourished teenager).						
40. Groups planning to report to class on topics (such as "Food Affects Our Appearance," or "Where or How Do We Get Energy?")						
41. A group preparing a skit to illustrate the effect of (reducing caloric intake to an extreme, or choosing foods from a restaurant or lunchroom menu when weight loss is desired).						
42. Students preparing posters for exhibit (topics might be "How Do Your Snacks Score?" or "Good Nutrition Is_____.").						
43. Students preparing nutritious snack foods, serving class members and pointing the contribution these foods can make toward achieving a well-balanced diet.						

Statement	Technique		Effectiveness			
	Have Used	Have Not Used	Rating of Use			
	1	2	3	2	1	0
44. A student preparing a display (to show that food COSTS are NOT related to nutritional value).						

*Please list other "individualized" techniques you have used:

_____