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Planning, and  
Evaluation

# The Use of Cooperative Extension Service Home Economists to Train Foodservice Workers in the National School Lunch Program

The Food and Nutrition Service of the United States Department of Agriculture is pleased to announce the publication of this report. In particular, we wish to thank the individuals and the staff of the 32 schools involved in the study. We appreciate the assistance that was provided in conducting the Cooperative Extension Service of the United States Department of Agriculture in Washington, D.C., and in Cooperative Extension Service offices throughout the United States.

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## Executive Summary

The Food and Nutrition Service (FNS), an agency of the U.S. Department of Agriculture (USDA), conducted a pilot project to assess the feasibility of using home economists from the Cooperative Extension Service (CES) of USDA to train school foodservice managers in the principles of foodservice management and in the effective utilization of USDA-donated foods.

Two training models were developed cooperatively by FNS and CES. Both models involved the use of FNS program aids. One of the models also included a formal program of 40 hours of training for foodservice managers which was conducted by CES home economists. Thirty-two schools participated in the project. The foodservice managers in half the schools received program aids. The others received training as well as the aids.

A knowledge assessment survey was administered to all of the foodservice workers. Additionally, onsite evaluations of foodservice operations were conducted in all of the schools.

The foodservice managers who received training materials and training from the CES home economists showed greater improvement in their knowledge assessment scores than did the foodservice managers who received only the training materials. This is possibly because the home economists were effective in communicating specific concepts to the foodservice managers. It is also possible, however, that the foodservice managers who received materials and training benefited simply from the extra attention that they received. The study does not demonstrate whether the foodservice managers retained that knowledge nor does it show clearly what effect the acquired knowledge had on actual practice.

There are indications that in some instances the training may have been instrumental in reinforcing existing good practices or in preventing the occurrence of new problems related to the foodservice systems in the participating schools, but these results cannot be used to predict the outcome of a similar training program on a nationwide basis.

In addition to examining a particular intervention, the study describes foodservice operations in the schools studied. It points to portion size control, the service of condiments, and the attractiveness of the serving line as areas in which some improvement is needed. It also reports that most of the participating schools were successful in adjusting recipes, using reasonable amounts of sugar, fat, and salt in food preparation, and staggering food production.



## **Chapter I: Introduction**

### **INTRODUCTION**

The National School Lunch Program (NSLP), administered by USDA, operates in approximately 94,000 schools throughout the country. FNS establishes regulations for program operations, monitors the program, and is also responsible for the provision of guidance materials and training for foodservice workers in the NSLP.

It has been suggested that other agencies in USDA have resources and expertise which could be used effectively in NSLP training efforts. To implement the pilot project mandated under Section 10 of the National School Lunch Act as amended by Section 20 of Public Law 95-166, the Food and Nutrition Service conducted a pilot project to assess the feasibility of using home economics from CES to train school foodservice managers in the principles of foodservice management and in the effective utilization of USDA-donated foods.



## Chapter II: Study Design and Methods

### STUDY DESIGN

A total of 32 schools participated in the study. The schools were selected from two States, with four school districts per State, and four schools per district. In each district, two schools were selected with a fifth grade and two schools were selected with a tenth grade. Only schools with onsite food preparation and service were included in the study.

Each of the 32 schools in the study participated in the NSLP. Participating schools were required to serve lunches that met the meal pattern in effect during school year 1978-79. The pattern is based on the 1968 Recommended Dietary Allowances (RDA's) for 10- to 12-year-old children published by the Food and Nutrition Board of the National Research Council, National Academy of Sciences. It is designed to provide nutritious and well-balanced meals which, when averaged over a period of time, will approximate one-third of the RDA's for children.

The States of Tennessee and Utah, where CES home economists possessed the necessary expertise and were available for training, were selected to participate in the project. Following guidance provided by the Washington Office, FNS Regional Offices worked with these States to identify the participating schools. Participation was voluntary on the part of the States, districts, and schools.

Two training models were developed cooperatively by CES and FNS. Both models involved the dissemination of FNS program aids. In addition, the first model included a formal program of 40 hours of training for foodservice managers in menu planning and quantity food preparation. The teaching sessions were conducted by CES home economists utilizing lesson information from the FNS program aids. The 16 schools which participated in the study under this model are referred to below as the "teaching schools." In the second model, the FNS program aids were provided directly to the foodservice managers in the selected schools and no formal teaching was given. The 16 schools under this model are referred to as the "control schools."

### DATA COLLECTION AND ANALYSIS

Prior to implementation of the two models to be tested, baseline data were collected in all 32 schools in the fall of 1978. In the spring of 1979, post-test data were collected. The two waves of data collection are referred to as Phase I and Phase II, respectively.

In each phase, the foodservice managers of the 32 schools completed knowledge assessment surveys administered by CES home economists from Utah and Tennessee who served as data collectors. The surveys included a series of questions on menu planning practices and on food preparation procedures.

The data collectors also recorded their observations on menu planning practices, food preparation procedures, and the quality of the meals in terms of the types of foods served and in terms of the appearance, texture, and temperature of the foods served. These observations were used to complete an onsite evaluation of foodservice operations.

The questions asked of foodservice managers were used as a basis for assessing their level of knowledge of menu planning practices and food preparation procedures. In each of these areas, a knowledge assessment rating was derived for each foodservice manager from analysis of the survey responses. In addition, a composite score was computed, reflecting overall knowledge in all areas combined. However, these composite scores were not used in the final analyses, since they did not add appreciably to the more easily interpretable ratings in individual topical areas.



The second set of data, from the onsite evaluations, were analyzed on an individual basis in order to eliminate the problems inherent in the composite score. Because of the nature of certain study questions, portions of this analysis had to be carried out on the basis of subsamples. The small size of these subsamples underscores the need for a descriptive treatment of the study data. No problems were apparent in Phase I in several areas of school foodservice evaluated during the onsite visits. In these instances, the data were analyzed to show whether reinforcement of existing good practices had occurred as a result of implementing the training models.

To determine participation levels, attendance or enrollment figures were recorded for the 5-day period in each phase of the study. The number of students participating in the NSLP and the number of those who received full price, reduced price, or free lunches was also recorded for each of those days.

#### LIMITATIONS OF THE DATA

The initial sample size of 32 schools is too small to allow statistically valid conclusions to be drawn for the 94,000 schools that participate in the NSLP. Since tests of statistical significance would therefore not have been meaningful, a more appropriate descriptive treatment of the data was undertaken.

In addition to the small sample size, the schools were selected from just two States, whose school foodservice operations may or may not be considered representative. The two States were selected because of their willingness to participate in the study and also because the CES home economists in those States possessed the necessary expertise and capabilities to conduct this type of project. As a result, the sample may be subject to some selection bias. In particular, the sample may have consisted of schools from States where the teaching model could be implemented most successfully.

Foodservice managers in different schools may perform different functions, and this variability was not taken into account in the original study design. For example, much of the onsite evaluation concerned menu planning. However, about half the foodservice managers from the teaching schools in Utah were found not to be directly involved in menu planning. Similarly, many questions applied to the monitoring of quantities and types of commodities used in food preparation. Availability and distribution of commodities vary with districts and States, and a foodservice manager's responsibilities in this area may be limited. The effectiveness of training could not be assessed through the monitoring of changes in areas outside the control of the foodservice managers.

In those instances where areas evaluated were clearly within the realm of responsibility of the foodservice managers, it is possible that insufficient time was allowed for changes in practices to be implemented. Post-training data collection was begun in both States less than 1 month after the last lesson on the teaching agenda. The study findings may not, therefore, reflect the full impact of the teaching model. Furthermore, no followup measure was undertaken which would indicate whether the initial impacts persist over a longer period.

The data collection instruments had some limitations. There was no field testing of the knowledge assessment forms or the onsite evaluation forms prior to the collection of baseline data in Phase I. Therefore, the extent of the problems associated with these instruments, particularly the onsite evaluation, was not apparent until the data were undergoing preliminary analyses. A substantial portion of the questions included in the onsite evaluation forms required the exercise of judgment on the part of the data

collector. In several instances this resulted from ambiguities in certain questions. Other questions suffered from a lack of previously established criteria for the interpretation of key terms by the data collector.

The training for the data collectors was not sufficiently precise to ensure uniform interpretation of the intent of onsite evaluation questions by the data collectors. This is of particular importance because the data collectors varied from school to school, and in some instances between phases in the same school. Intra- and inter-school comparisons are difficult to make when there is no guarantee that the evaluation instruments were similarly or consistently interpreted by the several data collectors.

Overall, the size and nature of the study sample and the subjectivity of some of the study observations limit the applicability of the findings. The study may be seen as providing insights into the implications of using Extension home economists to train foodservice managers in the specific settings examined. However, findings may not necessarily be representative of other locations where there may be a variation in the circumstances of school foodservice operations and in the educational backgrounds and levels of expertise of CES home economists.



## Chapter III: Results

### KNOWLEDGE MEASURES

Composite scores for the knowledge assessment surveys administered to the foodservice managers in both Phase I and Phase II were used for the final comparison of results between the study phases and between the teaching and control groups. Table 1 presents the scores received by control and teaching schools for the assessment of menu planning knowledge. The average scores received by control and teaching schools in Phase I are similar. In Phase II, the control school average score rose by 3.2 percent. The teaching school average score, however, increased substantially by 24.8 percent.

If the increase in the control school average score is considered to be a "practice effect," due to taking the same test twice, then the increase in the teaching school average score minus this factor may represent the effect of the teaching program on the knowledge of the foodservice managers. This adjusted increase is 21.6 percent and is still substantially higher than the average score for the control schools.

Table 2 presents the scores received by control and teaching schools for the assessment of food preparation knowledge. The results for only 15 of the 16 teaching schools were included in this analysis because one teaching school had a single score of one point; this uncharacteristically low score was excluded. The average Phase I scores for control and teaching schools differ by just 2 points. In Phase II, the control school average score decreased slightly. In contrast, the teaching school average rose by 22.7 percent. When the scores are adjusted for the effect of repeating the test, the increase in the teaching school average score remains the same.

Overall, the data suggest that those foodservice managers who participated in the teaching program increased their knowledge to a greater extent than did the managers who just used written aids. Taking the practice effect into account, the comparable magnitude of the improvement in the areas of menu planning and food preparation, 21.6 and 22.7 percent respectively, further suggests that the teaching program had a consistent beneficial effect. However, no predictions can be made from these data as to the lasting effect of the teaching on the knowledge of the foodservice managers.

### SKILLS AND PRACTICES MEASURES

Three aspects of foodservice operations were evaluated.

#### Menu Planning

Data collectors reported on certain aspects of menu planning. They made determinations about the appropriateness of menu substitutions that the foodservice workers made. Judgements about the substitutions were made according to whether the types and quantities of food specified by the school lunch meal pattern were provided. Of the seven teaching schools in this subsample, all were reported as making substitutions of an appropriate kind in both Phase I and Phase II. Seven of the nine control schools in the subsample were similarly reported as making appropriate substitutions in both phases. The remaining control schools showed an improvement in Phase II.

The data from each school were analyzed to ascertain the methods used to determine menu acceptability in Phases I and II. This breakdown is given in table 3. The data indicate that the total number of methods used by the 16 teaching schools decreased whereas those used by the 16 control schools increased. This may reflect a more focused effort on the part of the teaching schools, possibly as a result of the teaching program.

TABLE 1  
KNOWLEDGE ASSESSMENT SCORES: MENU PLANNING  
(Percent correct)

School Type	Average Scores	
	Phase I	Phase II
Control (n=16)	50.6	53.8
Teaching (n=16)	51.2	76.0

Source: Compiled from data collected during Foodservice Training Study, 1978-79.

TABLE 2  
KNOWLEDGE ASSESSMENT SCORES: FOOD PREPARATION  
(Percent correct)

School Type	Average Scores	
	Phase I	Phase II
Control (n=16)	59.0	58.5
Teaching (n=15) <sup>a/</sup>	57.0	79.7

<sup>a/</sup> One school with an uncharacteristically low score was excluded from the analysis.

Source: Compiled from data collected during Foodservice Training Study, 1978-79.



TABLE 3  
NUMBER OF SCHOOLS USING VARIOUS METHODS  
TO DETERMINE THE ACCEPTABILITY OF MENUS TO STUDENTS

Method	Control (n=16)		Teaching (n=16)	
	Phase I	Phase II	Phase I	Phase II
Plate Waste	2	6	8	9
Feedback From Students	1	0	7	4
Observation (unspecified)	1	2	5	2
Student Council/Committee etc.	4	2	2	1
Survey	2	6	1	0
Student Choices	2	1	0	1
Other <sup>a/</sup>	3	3	0	3
All Methods	23	20	15	20

<sup>a/</sup> Other methods include: participation, experience, and evaluation with managers.

Source: Compiled from data collected during Foodservice Training Study, 1978-79.

## Food Preparation

The data on food preparation pertain to the extent of reported problems in certain areas. Data collectors reported that some foodservice managers had problems adjusting recipes to prepare adequate quantities of good quality food. There were some reports of excessive use of sugar, fat, or salt in meal preparation. Also, some managers did not stagger food production to maintain uniform workloads and to avoid peaks and valleys in labor requirements. Table 4 illustrates the few changes that took place in these areas between Phase I and Phase II. It also indicates that very few schools in each phase used excessive amounts of sugar, fat, and salt in food preparation.

Observations of various methods of portion size control were made. Those methods are listed in table 5, which also indicates how many teaching schools and how many control schools in each phase were judged, by the data collectors, to have problems with the methods. The use of scales to determine portion sizes by weight frequently caused unfavorable reports in both study phases. Initially there were more unfavorable reports about the portion size control methods used in the teaching schools but the majority of those were corrected in Phase II and few new problems were reported. The number of unfavorable reports for all of the schools decreased between Phase I and Phase II.

## Meal Quality

To evaluate meal quality, data collectors made observations about the appearance, taste, texture, temperature, and quantity of the foods served. The analysis of those data reflect few consistent differences in those areas between teaching and control schools in either phase.

Some reported problems were common to many of the schools, irrespective of their assignment to the study models. The flavor and texture of the meat/meat alternate and the texture of cooked fruits and vegetables were the most notable areas of concern. Another persistent problem was the appearance of the total meal, particularly in terms of variety in the colors of foods served. The lack of attractive garnishes was frequently reported for puddings and compotes. Another problem area was the uniformity and appropriateness of the portions served. Relishes and condiments were the cause of several persistent problems: the servings were frequently considered either wasteful or insufficient, and the taste either too spicy or not flavorful; and when the relishes or condiments were served in individual packs these were reportedly difficult to open.

Data collectors reported that the school lunch meal pattern requirements were met by all of the schools in both phases of the study. Meals were also evaluated by the data collectors to determine whether sources of vitamin A, vitamin C, and iron were included with the frequency recommended in NSLP guidance materials. These data are presented in table 6 in terms of changes between study phases.

## PARTICIPATION

NSLP participation was examined as a possible index of the attitudes of students towards the meals that were served in the study schools. Table 7 presents comparisons of average student participation as a percent of school attendance or enrollment for Phases I and II. No substantial change in the average level of participation in the school lunch programs was apparent between the study phases. A breakdown of these data according to price category (paid, reduced, or free), did not reveal any disguised trends.

TABLE 4  
NUMBER OF SCHOOLS WITH NO REPORTED PROBLEM IN  
SELECTED AREAS OF FOOD PREPARATION IN PHASE I AND PHASE II

Area of food preparation	Control Schools (n = 16)		Teaching Schools (n = 16)	
	Phase I	Phase II	Phase I	Phase II
Recipe adjustment	16	14	15	15
Staggering food production	16	14	14	15
Sugar levels	16	16	16	16
Salt levels	15	16	16	16
Fat levels	16	15	16	14

Source: Compiled from data collected during Foodservice Training Study, 1978-79.

TABLE 5  
PORTION SIZE CONTROL METHODS  
NUMBER OF UNFAVORABLE REPORTS AND CHANGES BETWEEN PHASE I AND PHASE II

Method	Control Schools (n = 16)			Teaching Schools (n = 16)			All Schools (n = 32)	
	Phase I	Phase II		Phase I	Phase II		Phase I	Phase II
		persisting	new		persisting	new		
Portion scales	3	2	-	5	3	1	8	6
Scoop size	-	-	1	4	2	-	4	3
Portion ladles or spoons	-	-	-	4	-	-	4	-
Proper use of implements	1	1	2	3	-	2	4	5
TOTAL	4	3	3	16	5	3	20	14

Source: Compiled from data collected during Foodservice Training Study, 1978-79.

TABLE 6

PROVISION OF FOODS WHICH SUPPLY CERTAIN NUTRIENTS:  
NUMBER OF UNFAVORABLE REPORTS AND CHANGES BETWEEN PHASE I AND PHASE II

Nutrient	Control Schools (n = 16)				Teaching Schools (n = 16)			
	Phase I	Phase II		new problem	Phase I	Phase II		new problem
		no change	improvement			no change	improvement	
Vitamin A	1	-	1	1	4	1	3	-
Vitamin C	4	-	4	4	5	2	3	4
Iron	-	-	-	3	4	-	4	3

Source: Compiled from data collected during Foodservice Training Study, 1978-79.

TABLE 7

AVERAGE PARTICIPATION FOR  
PHASE I AND PHASE II AND DIFFERENCES

Percent

School Type	Phase I	Phase II	Difference
Control (n = 16)	68.5	72.1	+3.6
Teaching (n = 16)	68.6	68.6	0.0

Source: Compiled from data collected during Foodservice Training Study, 1978-79.





TABLE 4

PERCENTAGE OF AGENTS WHICH REPORTED AVERAGE PARTICIPATION  
IN PHASE I AND PHASE II OF THE TRAINING PROGRAM

Category	Control Schools (n = 167)			Treatment Schools (n = 151)		
	Phase I	Phase II	Both	Phase I	Phase II	Both
	Average Experimental problem			Average Experimental problem		
Titanic A	3	1	1	4	2	2
Titanic B	4	1	1	5	2	2
Life			2			

Source: Compiled from data collected during Transportation Training Study, 1978-79.

TABLE 5

AVERAGE PARTICIPATION FOR  
PHASE I AND PHASE II OF THE TRAINING PROGRAM

Percent

School Type	Phase I	Phase II	Both
Control (n = 167)	28.2	21.5	12.1
Treatment (n = 151)	29.8	21.5	9.2

Source: Compiled from data collected during Transportation Training Study, 1978-79.